

**Notice of Inquiry pursuant to Section 1700.310 of the Illinois
Administrative Code**

Notice of Inquiry Regarding Electric Vehicles

Report to the Commission

NOI Managers:

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I. Background

As the cost of batteries decreases and environmental and climate issues become more pressing, electric vehicles (“EVs”) are becoming a viable alternative to internal combustion engine vehicles. According to Bloomberg New Energy Finance’s Electric Vehicle Outlook 2018 report (“Bloomberg report”), 55 percent of all new car sales and 33 percent of global fleets will be electric by 2040. Furthermore, at current global sales rates, consumers buy a million EVs every six months, representing a substantial portion of auto market sales growth. The Bloomberg report also indicates that by 2030, 84 percent of all municipal bus sales will be electric globally. E-bus and electric fleets are driving market growth due to compelling fleet economics. E-buses have lower operating costs, travel faster, displace transport fuel, and reduce harmful emissions, improving air quality in Urban areas. Additionally, municipal bus fleets ownership costs are cheaper than conventional municipal bus fleets ownership costs. Although EVs have high up-front costs and currently still represent a small portion of total vehicle sales, they have low maintenance costs, they reduce carbon emissions, and may help stabilize the electric grid.

The current electric grid was not built with EVs in mind. Economic and policy driven changes supporting the proliferation of EVs will have profound impacts on the grid itself. Sensible accommodations for EVs could lead to many benefits to the grid. However, unmanaged adoption may impact electric grid costs and stability in negative ways. Policy concepts should reflect the public interest.

On April 4, 2018, the Illinois Commerce Commission (“Commission” or “ICC”) hosted a policy session on the nexus between EVs and grid stabilization. Panelists included utilities, EV manufacturers, and consumer advocates, among others. On September 18, 2018, the Commission hosted a second policy session relating to transportation electrification. Panelists included fleet companies, public transportation agencies, and EV manufacturers, among others. The policy sessions helped the Commission explore the benefits and impacts of EVs on the electric grid, understand ways to foster EV growth in Illinois, and determine some possible best practices for rate structuring and promoting energy efficiency in Illinois.

The policy sessions provided valuable information showing that uncoordinated EV charging could lead to negative impacts, such as power losses and voltage variations that overload the electric grid. Panelists agreed that inefficient, uncoordinated charging is the most pressing challenge relating to EV penetration today. If customers charge their EVs during costly, peak demand times, it could negatively impact the power grid. Conversely, coordinated charging could minimize the need for certain instances of frequency regulation, smooth out generation intermittency from distributed energy resources (“DERs”), and allow for improved efficiencies on the grid as a whole.

It is critical that industry stakeholders collaboratively develop best practices for the efficient charging of EVs in areas such as rate design, peak load demand, building codes, and monetary and non-monetary incentives. Once best charging practices are determined, and energy storage technology is further developed, EVs may, in addition to reducing carbon emissions, have the potential to help stabilize the grid and serve as DERs.

Because EV adoption in Illinois is still in the early stages, the Illinois EV regulatory framework is also in its infancy. While many actors are penetrating the EV industry, regulatory uncertainty discourages utilities and customers from participating at a larger scale. It remains unclear how to efficiently integrate EVs into the current electric system, how to treat charging infrastructure from an ownership perspective, how to determine appropriate rate structures, and how to encourage efficient EV charging practices to support grid stability without burdening non-EV owners.

Accordingly, on September 24, 2018, the Commission initiated a Notice of Inquiry (“NOI”) as a vehicle for gathering information and opinions from stakeholders on electric vehicles to help the Commission identify issues, potential challenges, and opportunities in EV deployment. The NOI is not intended to result in immediate Commission action but rather, serve as an information gathering exercise to help the Commission identify issues, potential challenges, and opportunities in EV deployment.

Interested parties were asked to respond to the following questions and issues:

Energy Efficiency:

- A. Do EVs contribute to energy efficiency in Illinois by relying on electricity instead of fossil fuels? If so, how?

- B. Describe whether and how EV charging stations will affect overall energy efficiency in Illinois.
 - a. Describe whether and how development of additional charging infrastructure will affect overall energy efficiency in Illinois.

Grid Reliability and Resilience:

- A. Describe whether and how EVs will improve grid reliability and resilience.
- B. Identify best charging practices and whether and how they can relieve pressure on the grid during peak-demand times, as well as relieve pressure on individual circuits.
 - a. Describe whether and how transportation electrification in the public and non-residential sectors will affect the load on the electric grid.
- C. Describe whether and how development of additional charging infrastructure will affect grid reliability and resilience.
- D. What other types of technology can be used to support grid reliability and resilience with continued electrification of the transportation sector?
- E. Do vehicle-to-grid capabilities need to be enabled in order for EVs to provide grid support?
- F. What control by the utility is necessary to ensure reliability and efficient operation of the grid?
- G. Identify cybersecurity implications, if any, of widespread EV adoption.
 - a. Discuss the potential for EVs to be a vector for smart grid control network penetration.
 - b. Discuss the potential for EVs to be a vector for causing physical disruptions if charging and discharging is coordinated in a malicious manner as part of a botnet under the control of malicious actors.

Barriers:

- A. Describe regulatory barriers to increased electrification of the transportation sector.
 - a. Identify possible solutions to overcome regulatory barriers.
- B. Describe economic barriers to increased electrification of the transportation sector.
 - a. Identify possible solutions to overcome economic barriers.
- C. Describe any other barriers to increased electrification of the transportation sector.
 - a. Identify possible solutions to overcome those barriers.
- D. Should Illinois prioritize overcoming certain barriers over other barriers?

Benefits:

- A. Describe the cost benefits associated with increased EV deployment in Illinois.
 - a. What is the effect on the State?
 - b. What is the effect on individual EV owners?
- B. Describe the environmental benefits associated with increased EV deployment in Illinois.
 - a. Compare environmental benefits to the environmental detriment if additional EV and charging infrastructure is not developed and deployed.
 - b. Describe the environmental effect of EVs on the environment over the lifespan of an EV.
- C. Describe any other benefits associated with increased EV deployment.

EV Charging Infrastructure:

- A. Describe whether more charging stations should be developed in Illinois.
 - a. What external sources could be used to identify the optimal ratio of EVs to charging stations?
 - b. Describe the rate at which additional public charging infrastructure needs to be developed to meet the demand of increasing numbers of EVs in Illinois.
 - c. To what extent and at what rate do customer-owned chargers need to be developed?
- B. Identify the costs associated with installing additional charging infrastructure throughout the state. Assume that installation includes distribution build out, customer make-ready work, and charging equipment.
 - a. Describe who would carry the costs of each aspect of building additional charging infrastructure.
 - b. Describe whether ratepayer funds would pay for any aspect of building charging infrastructure.
- C. Describe whether additional charging stations should be installed in densely populated areas, in areas outside densely populated cities, or both.
 - a. Describe how EV charging infrastructures could penetrate low income communities that generally do not have high EV adoption.
- D. Discuss ownership of charging stations.
 - a. Discuss whether utilities should own charging stations. Explain why or why not.
 - b. Discuss whether third party vendors should own the charging stations. Explain why or why not.
- E. Describe whether charging stations should consist of DC Fast Chargers, slow chargers, or a mixture of both. Explain why.

- F. What other utility service options, especially those currently offered in other jurisdictions, could promote EV adoption?
- G. What kinds of building code considerations should be kept in mind?
- H. What kinds of ordinance changes can help encourage EV adoption?
- I. What other municipal codes can encourage EV adoption?
- J. Describe technical standards, guidelines, and best practices to manage EV charging standards.

Ratemaking:

- A. Describe whether utilities should charge time-varying rates, such as time-of-use rates, to incentivize EV penetration in the state. Explain why or why not.
 - a. How would EV drivers benefit from these rates?
- B. Discuss whether charging infrastructures should be included in the rate base if the charging infrastructure is owned by public utilities. Explain why or why not.
 - a. Discuss whether charging infrastructures should be accounted for as capital expenses. Explain why or why not.
 - b. Discuss whether charging infrastructures should be accounted for as operational expenses. Explain why or why not.
- C. What rate designs have other utilities implemented to encourage EV adoption and how successful have they been?

Regulatory Treatment of EVs and Charging Stations:

- A. Discuss whether EVs should be treated as distributed energy resources (“DERs”) for regulatory purposes. Explain why or why not.
 - a. Discuss whether passenger cars, transportation vehicles, and corporate fleets should be treated equally. Should one type be favored over others? Explain why or why not.
 - b. How can unique demand response programs be structured for each customer classification?
- B. Discuss how common charging stations should be categorized for regulatory and accounting purposes.
- C. Discuss how privately-owned charging stations should be categorized for regulatory purposes.
 - a. Should common charging stations and privately-owned charging stations enjoy the same regulatory and accounting treatment?
- D. Discuss what kinds of incentives could be implemented to encourage further EV penetration into the US markets.

Initial comments were due on October 23, 2018 and were submitted by ABB Inc. (“ABB”), Advanced Energy Economy (“AEE”), the People of the State of Illinois (“AG”), Ameren Illinois Company d/b/a Ameren Illinois (“Ameren”), Americans for Prosperity Illinois (“AFPI”), American Petroleum Institute-Illinois Petroleum Council (“API-IPC”), Alliance for Transportation Electrification (“ATE”), Chicago Area Clean Cities Coalition (“CACC”), ChargePoint, Inc. (“ChargePoint”), Commonwealth Edison Company (“ComEd”), the Citizens Utility Board and the Environmental Defense Fund (“CUB/EDF”), Elevate Energy, EVgo, Illinois Industrial Energy Consumers (“IIEC”), Illinois Chamber of Commerce (“the Chamber”), Illinois Manufacturers’ Association (“IMA”), Metropolitan Mayors Caucus (“MMC”), Danilo J. Santini (“Santini”), Siemens, Sierra Club and Natural Resources Defense Council (“Sierra Club and NRDC”), Tesla, Inc. (“Tesla”), Union of Concerned Scientists (“UCS”), and Workhorse Group, Inc. (“Workhorse”).

Reply Comments were due on November 16, 2018 and were submitted by AFPI, Chanje Energy, Inc. (“Chanje”), ChargePoint, ComEd, Greenlots, Institute for Energy Research (“IER”), IIEC, Santini, Sierra Club and NRDC, Tesla, and UCS.

II. Comments

A copy of all Initial and Reply Comments submitted by the parties can be found at <https://www.icc.illinois.gov/Electricity/workshops/evnoi.aspx>. Below is a summary of the comments received, organized by questions raised in the EV NOI.

Energy Efficiency:

A. Do EVs contribute to energy efficiency in Illinois by relying on electricity instead of fossil fuels? If so, how?

ABB states that electric vehicles are inherently energy efficient by virtue of their electric drivetrain.¹ Specifically, ABB explains that electric motors offer efficiency above

¹ ABB Initial Comments at 2.

90%, while most internal combustion engines (“ICEs”) operate with an efficiency of about 20%.² The regenerative braking system in all EVs also contributes to EV energy savings.³

Ameren notes that studies support the concept that EV adoption would contribute to energy efficiency in Illinois because EV engines are significantly more efficient than internal combustion engines and their widespread adoption could lead to a reduction of energy on a per/BTU basis.⁴ In addition, Ameren notes that while some have noted that large-scale EV adoption could provide higher end-use electric loads in Illinois, if energy efficiency and demand response programs evolve along with EV adoption, the resulting load shapes could yield a more efficient use of the grid. Ameren states that it is generally recognized that ICE vehicles are typically less efficient on a “well-to-wheels” basis. Therefore, Ameren argues that an evolved energy efficiency policy in Illinois that quantifies savings from EV efficiency on a per/BTU basis, promotes sound management of additional load from EVs, encourages EV owners to charge vehicles at off-peak times, uses smart-charging technologies, and incorporates equitable principles that address impacts on, and access by all communities, will be important.⁵

The Alliance for Transportation Electrification believes increased adoption of electric vehicles should have no direct impact on regulatory policies and incentives regarding energy efficiency measures.⁶ Energy efficiency measures should continue to be measured under traditional portfolio analysis and cost-benefit methodologies traditionally used for all sectors- residential, commercial, and industrial. Certain energy efficiency measures will continue to be cost effective constituting minimal risk as demand side management resources under most long-term planning scenarios.

ATE argues for implementation of a broader framework to examine overall energy usage, especially the conversion of primary energy on a BTU basis in final use accounting for losses along the path of conversion such as transmissions losses for electricity (estimated to be about 7%) and refinery losses during the process of refining crude oil to

² Id.

³ Id.

⁴ Ameren Initial Comments at 3.

⁵ Id.

⁶ ATE Initial Comments at 1.

gasoline (estimated to be about 10%). See EPRI's analysis in U.S. National Electrification Assessment ("USNEA"). ATE argues for new metrics and approaches to measure the significant efficiency gain achieved in primary to final energy usage by moving from internal combustion engine vehicles to battery electric vehicles. Furthermore, the Commission should take into account Illinois generation mix, including the significant amounts of fossil generation and its significant zero carbon nuclear generation fleet as well as the variations in the generation mix by season, hour, location, and fuel price variation over a period of time. ATE believes shifts toward lower carbon sources of generation will continue to accelerate in Illinois and the Midwestern region for economic and environmental factors.⁷

ComEd states that vehicles that rely on electricity, rather than fossil fuels, contribute to the overall energy efficiency of Illinois. According to the Department of Energy, conventional gasoline vehicles only convert about 17% to 21% of the energy stored in gasoline to power at the wheels. Comparatively, EVs convert about 59% to 62% of the electrical energy from the grid to the power at the wheels.⁸ Similarly, electric buses offer potential energy efficiency opportunities. Recent studies by the National Renewable Energy Laboratory ("NREL") found that compared to 4.2 miles per diesel gallon achieved by traditional diesel transit buses, electric buses can achieve the equivalent of up to 17.3 miles per diesel gallon.⁹

ComEd states that it is not likely that additional EVs would directly impact ComEd's Energy Efficiency Program pursuant to Section 8-103B of the Illinois Public Utilities Act.¹⁰

Tesla states that EVs are inherently more energy efficient than ICE vehicles and have the ability to reduce overall energy usage for the state. For example, Tesla's 2018 models have an Environmental Protection Agency ("EPA") fuel efficiency rating of between 85 and 130 miles per gallon-equivalent ("MPGe"), while the Bureau of Labor

⁷ Id. at 3.

⁸ ComEd Initial Comments at 2.

⁹ Id.

¹⁰ Id.

Statistics reported the average fuel economy of light-duty vehicles is about 24 miles per gallon (“MPG”). The EPA developed the MPGe metric to provide an apples-to-apples comparison of the relative efficiency of an electric vehicle to an ICE vehicle. The EPA uses 33.7 kilowatt hours as the equivalent energy content of 1 gallon of gasoline.¹¹

The UCS states that engine efficiency is the main reason for switching from a fossil fuel vehicle to an electric vehicle.¹² The UCS explains that EVs use less energy to cover the same distance than comparable gas or diesel vehicles because electric engines are more efficient than internal combustion engines, even with transmission and distribution losses.¹³ UCS refers to the U.S. Department of Energy and states that electric engines are more efficient because they convert 54-62% of the electric energy they receive, while internal combustion engines convert only 17-21% of the energy stored in gasoline to power.¹⁴

IIEC states that traditionally, energy efficiency goals and programs offered by the utility aim to reduce overall electric usage.¹⁵ In the case of EVs, IIEC contends that new load is being added to the system. IIEC argues that whether or not energy efficiency goals and metrics should be adjusted to reflect the potential that EVs could replace gasoline consumption with electricity consumption, and the appropriate measurements to determine whether the full lifecycle of an EV is more energy efficient than an internal combustion engine vehicle should be considered by the Commission only if the Commission is given authority to consider this and incorporate it into the utilities’ energy efficiency plans. IIEC notes that this consideration, if otherwise appropriate, should be thorough and should take place within a regulated proceeding or working group, with appropriate input from all interested parties.

¹¹ Tesla Initial Comments at 2.

¹² UCS Initial Comments at 5.

¹³ Id.

¹⁴ Id.

¹⁵ IIEC Reply Comments at 2.

If the Commission were to conclude that EVs provide utilities with energy efficiency gains, IIEC indicates that it is likely that the utilities will request to include those efficiencies in meeting their annual energy efficiency targets, or to develop incentives to promote EV usage and pass those program costs onto ratepayers.¹⁶ The Commission has utilized a set of metrics to measure energy efficiency gains and to determine which utility programs toward those ends are most cost effective. If parties ever seek any changes to those metrics to incorporate EV load, IIEC says that all stakeholders should engage in the process of changing those metrics, within legislative bounds.

IIEC states that some parties have replied to the NOI seemingly convinced that EVs are more energy efficient than ICE vehicles.¹⁷ (See Initial Comments by Sierra Club and NRDC, Tesla, Alliance for Transportation Electrification, and Metropolitan Mayors Caucus.) IIEC does not think that this is an appropriate subject for investigation by the Commission. However, if ever investigated, IIEC believes that it should be investigated in the context of a dedicated working group or proceeding, with all stakeholder input and all appropriate analyses conducted.

In Dr. Santini's Reply Comments, he explains that there is a myriad of vehicle technology available, including short range plug-in hybrids, long range plug-in hybrids, other light duty plug-in hybrids, and all-electric vehicles.¹⁸ Energy efficiency will depend on how far EV customers need to drive the vehicle, when the vehicle is charged, and what kind of charger EV customers utilize. Dr. Santini argues that the marketplace implies that long-run mass market success of "electric" vehicles will come only if the vehicles keep their battery pack size and cost limited and use gasoline for long range functionality.¹⁹

Sierra Club and NRDC indicate that EVs contribute to energy efficiency in Illinois by relying on electricity instead of fossil fuel because using electricity as fuel results in dramatic efficiency gains over conventional fuels.²⁰ EV motors convert energy to power more efficiently than ICE where most of the energy consumed is lost as heat.

¹⁶ Id.

¹⁷ Id.

¹⁸ Santini Reply Comments at 3-5.

¹⁹ Id. at 11.

²⁰ Sierra Club and NRDC Initial Comments at 2.

Transportation electrification increases the total amount of electrical energy consumed, overall energy use declines as EVs shift demand away from petroleum fuels. Electrifying the transportation sector also reduces overall greenhouse gas and air pollutant emissions, provides opportunities to more efficiently utilize existing electricity assets, and shield customers from higher vehicle fueling and maintenance costs. The generation mix does impact the emissions performance of EVs relative to ICE vehicles. According to the Department of Energy, an EV charging on Illinois' grid already produces roughly 70 percent less greenhouse gas emissions per mile than a comparable ICE vehicle.²¹ Thus, EVs are a form of energy efficiency because they reduce total energy consumption relative to ICE vehicles.

B. Describe whether and how EV charging stations will affect overall energy efficiency in Illinois.

ABB states that when charging infrastructure is intelligently used, it can benefit grid asset efficiency.²² ABB explains that by allowing utilities to implement smart charging programs that incentivize off peak charging behavior and smarter home and office charging, it will allow power generators to operate more consistently and not suffer as much loss of efficiency from ramping assets down overnight.²³

Ameren points out that a well thought-out EV policy, when coupled with forward-thinking energy efficiency policy, has the potential to promote efficient electric usage, reduction in energy consumption on a per/BTU basis, and decreases in carbon emissions.²⁴ All of which Ameren states would benefit Illinois customers under a variety of cost-benefit analyses. In order to achieve this result, Ameren claims that good energy efficiency policy will recognize the value of providing certainty in the market to utilities and stakeholders regarding the costs and savings associated with EVs. For example, Ameren argues that a level of standardized savings, evaluation criteria, and costs associated with

²¹ Id. at 2.

²² ABB Initial Comments at 2.

²³ Id. at 2-3.

²⁴ Ameren Initial Comments at 3.

EV programs and design should be established. This could include the adoption of a new transportation technical resource manual (“TRM”) and/or modification of the existing Illinois Statewide Technical Reference Manual for Energy Efficiency (“IL-TRM”) to include EV-related measures, either of which could provide for a standard quantification of energy and environmental benefits - including novel categories of benefits related to bringing EV access to underserved areas, among other things.²⁵

ComEd believes that increased numbers of EV charging stations will increase electricity consumption by adding new load. However, this assists in the process of beneficial electrification by transitioning energy from less efficient and higher emission-based fuels to lower emission and higher efficient forms of energy. Additionally, if efficient EV charging stations are used, the benefits could be amplified further.²⁶ ComEd states that an increased number of Electric Vehicle Supply Equipment (“EVSE”) that are ENERGY STAR certified would positively impact Illinois’ overall energy efficiency.²⁷ ComEd states that additional EV charging stations could directly impact the Company’s Energy Efficiency Program if the Program is able to incent and claim savings from energy efficient charging stations, such as those that are ENERGY STAR certified.²⁸

Sierra Club and NRDC contend that energy efficiency and transportation electrification are well-positioned and aligned to enhance the flexibility, reliability, efficiency, and sustainability of the grid.²⁹

Efficient EV charging patterns present an opportunity to lower costs for all customers. According to Sierra Club and NRDC, like energy efficiency, electrification of transportation can reduce energy costs for all customers whether they drive or ride in EVs. EVs, excluding public transit and fleet vehicles, sit idle for a majority of the day. This flexibility allows for EV charging to occur at off-peak times when the grid is underutilized and when marginal costs to serve additional load are low. By increasing utility revenues and system load factor without commensurate increases in utility costs, off-peak

²⁵ Id. at 4.

²⁶ ComEd Initial Comments at 2.

²⁷ Id. at 3.

²⁸ Id.

²⁹ Sierra Club and NRDC Initial Comments at 3.

incremental EV load can help shield all utility customers from electricity rate increases and put downward pressure on electricity rates by spreading fixed system costs over a greater number of kilowatt-hours (“kWh”) sold. Costs of integrating EVs elsewhere in the U.S. have been negligible: California’s three largest investor-owned utility have found that with over 270,000 EVs in their collective service areas, they spent \$500,000 out of approximately \$5 billion (0.01 percent) in capital investments on distribution system upgrades attributable to EVs in 2017.³⁰ An average Illinois household spend approximately \$1,100 annually on electricity. However, the average household spends \$2,000-\$3,000 annually on motor fuel expenditures. Because electricity costs about half that of gasoline even when oil prices are low, Illinoisans have significant potential to save on vehicle fueling costs with EVs and reduce their *overall* energy costs.³¹ Chicago Transit Authority states that the new electric buses they have purchased save \$27,000 annually in fuel and maintenance costs per bus relative to standard diesel buses.³²

According to Sierra Club and NRDC, switching to an EV is an energy efficiency decision because EVs reduce overall energy use, and if flexible EV load is well-managed, transportation electrification won’t contribute to system peaks.

Furthermore, Sierra Club and NRDC note that EVs emit 70 percent less greenhouse gas emissions than ICE vehicles. Additionally, EVs can be leveraged as distributed energy resources to better integrate variable renewable generation onto the grid and provide valuable grid services.³³

Tesla states that EV charging stations can help with demand management and better utilization of the electric grid’s fixed infrastructure. EV charging can be more efficiently integrated via price signals such as time-of-use (“TOU”) rates that incentivize charging at times that are beneficial to the grid and drive down cost savings for consumers.³⁴

³⁰ Id. at 3.

³¹ Id. at 3.

³² Sierra Club and NRDC Initial Comments at 4.

³³ Id.

³⁴ Tesla Initial Comments at 3.

a. Describe whether and how development of additional charging infrastructure will affect overall energy efficiency in Illinois.

Ameren submits that the development of a strong charging network and evolved energy efficiency policy, including strong energy efficiency and demand response messaging and programming, could leverage and increase customer awareness, interest, and adoption of EVs.³⁵ For example, Ameren states that one current form of charging infrastructure - preferred parking spaces - is often located at the prime locations in a parking lot or garage to optimize awareness, education, and interest. Ameren argues that if utilities could co-promote EVs and energy efficiency at these prime locations, messaging would be delivered more effectively. Moreover, Ameren notes that additional energy efficiency platforms could be used to inform consumers and potentially third parties (dealers, ride share drivers, etc.) about the social and technological benefits of EVs and EV-related products. Ameren states that a portfolio of EV programs that coordinates information with energy efficiency incentives and supportive public policy has the potential to reduce market barriers and the need for additional peak capacity investment. Such a result, Ameren states, would provide benefits to the customers throughout Illinois.³⁶

Conversely, API-IPC states that refineries have made significant progress in upgrading their operations to produce cleaner fuels and meet federal and state fuel standards.³⁷ API-IPC further states that internal combustion engine vehicles are the backbone of the United States, with nearly 17 million ICE vehicles on the road, about 150,000 gasoline stations supporting ICE vehicles, 135 refineries, 212,000 miles of liquid petroleum pipelines, and 1,283 terminals supplying the transportation fuels.³⁸

³⁵ Ameren Initial Comments at 4.

³⁶ Id.

³⁷ API-IPC Revised Initial Comments at 5.

³⁸ Id. at 4.

API-IPC also notes that operational and capital expenditures are aimed at improving the performance of the oil and gas industries' products, facilities, and operations, and substantial air and water quality benefits have occurred as a result of the investments.³⁹ The API-IPC highlights that air pollution is 73% reduced since 1970, even though vehicle miles travel has nearly tripled and the economy has grown by 253%.⁴⁰

In light of these statistics, the API-IPC believes that transportation policies should acknowledge that consumers are purchasing ICE vehicles, which are staying on the road longer, and are driving on cleaner Tier 3 gasoline.⁴¹ API-IPC further states that policies that conflict with the will of the consumers and attempt to force changes in behavior should be considered with caution, as they may impose undue costs on consumers, with diminishing environmental benefits and unintended consequences.⁴²

ComEd states that the availability of additional charging infrastructure in Illinois may encourage customers and businesses to purchase EVs, which would likely increase both the EV rate of adoption and the number of EVSEs installed. Promoting EVSEs that are energy efficient, such as those that are ENERGY STAR certified, could help ensure that this new load (at least the charging portion of it) was as energy efficient as possible.⁴³

CUB/EDF argue that as EV charging load grows, so will the need for energy efficiency. CUB/EDF believes that with proper planning, cooperation, and incentives to manage charging load shape, cost-effective shifting of EV charging load can enable and accelerate progress toward reaching energy efficiency targets.⁴⁴

Tesla states that development of additional charging infrastructure will not have a negative impact on overall energy efficiency in Illinois if strategies to drive EV adoption and transportation electrification are pursued with existing energy efficiency efforts. Utilities

³⁹ Id.

⁴⁰ API-IPC Revised Initial Comments at 4.

⁴¹ Id.

⁴² Id. at 5.

⁴³ ComEd Initial Comments at 3.

⁴⁴ CUB/EDF Initial Comments at 2.

can incent beneficial energy behavior through energy efficiency and price signals. Tools can be adopted in the short term to collect data needed to develop programs that encourage EV adoption and better utilization of the electric grid.⁴⁵

Grid Reliability and Resilience:

ATE recommends defining “resiliency” and “reliability” of the electric system at the distribution level.

ATE defines “reliability” in a traditional sense under SADI and SAIF, measuring how reliably the distribution system can deliver adequate power as measured by duration and frequency of outages, while maintaining system adequate frequency regulation and voltage controls. “Resiliency” refers to the ability of the distribution system to both respond and recover from an external event attempting to disrupt the reliable operation and delivery of electric power to customers.⁴⁶

A. Describe whether and how EVs will improve grid reliability and resilience.

ABB states that EVs can hold a significant potential for grid reliability and resilience if there is a smart plan, thoughtful rate structures, and intelligent charging features like demand response and delayed or intermittent charging that flattens the overall load throughout the day and night.⁴⁷

ABB explains that fifty years ago, home air conditioning loads were not intelligently manageable, as cooling was needed on demand, in real time, and could not be actively deferred.⁴⁸ This caused inefficient use of the grid and generation assets.⁴⁹ In comparison,

⁴⁵ Tesla Initial Comments at 3.

⁴⁶ ATE Initial Comments at 3.

⁴⁷ ABB Initial Comments at 3.

⁴⁸ Id.

⁴⁹ Id.

ABB states that EVs today follow a predictable usage pattern and can be managed intelligently when they charge.⁵⁰ ABB states that charging loads can be shifted to night hours, which leads to a more efficient use of generation asset and an increased ability to harness nighttime wind generation.⁵¹

Ameren claims that in order for EVs to fully support and potentially improve grid reliability and resiliency, they must have the capability to supply energy back to the grid upon request, known as vehicle-to-grid (“V2G”).⁵² Ameren states that the charging, communication, and grid infrastructures also must be in place to support V2G. While there are some V2G technology pilots currently underway throughout the world, Ameren indicates that there are currently no EVs on the market that have this capability.

Ameren avers that until V2G is readily available and associated grid infrastructure is in place to support it, an EV resembles many other types of end-use device loads.⁵³ As such, Ameren argues that its ability to improve grid reliability and resiliency is minimal and limited to its ability to charge at appropriate times to either limit peak demands, or otherwise help to balance load with available generation.

ATE states that in general, EV adoption should have no significant impact on grid reliability and resiliency. EVs should be regarded as another demand side resource, specifically a distributed energy resource that provides benefits to the end-use consumers and distribution grid.⁵⁴

ChargePoint states that transportation electrification has the potential to improve grid reliability and resilience, as well as create value for all ratepayers. In effect, investments in EVSE exert a downward pressure on unit energy costs that can benefit all utility customers regardless of EV ownership. However, this is predicated on the EV load not resulting in excessive new investments in distribution infrastructure costs and avoiding

⁵⁰ ABB Initial Comments at 3.

⁵¹ Id.

⁵² Ameren Initial Comments at 4-5.

⁵³ Id. at 5.

⁵⁴ ATE Initial Comments at 3.

high cost “peak” generation and/or distribution time periods. The associated benefits of additional EV load to all utility customers could be significantly increased and grid infrastructure risks lowered by leveraging connected, smart charging infrastructure as well as developing smart charging programs.⁵⁵

The IIEC states that some parties cite studies suggesting that long-term energy revenues from EVs will exceed the added cost of distribution investment to support the added load.⁵⁶ (See Initial Comments of ChargePoint and Chicago Area Clean Cities Coalition). IIEC cautions that a conclusion of this nature would be predicated on numerous assumptions that would vary widely from utility to utility, specifically the type of tariff rates that are used to price EV load, whether the delivery utility is also the supplier of the electricity, the geographic spread of EV adoption, and the existing infrastructure and future needs in those areas where EV load may grow. IIEC believes it would be premature at this time to conclude that over the long-term, EV load will necessarily have a net beneficial effect on Illinois electricity customers.

The MMC states that EV charging, if planned and managed properly, could produce revenue from additional consumption during off peak times and offset additional infrastructure costs required to prepare for EV charging.⁵⁷ This would result in savings for rate payers. MMC indicates that opportunities to address grid stability include managed charging programs that are designed and implemented by electric utilities and reducing or eliminating demand charges for EV charging.⁵⁸

Sierra Club and NRDC state that EVs provide the grid with flexible, manageable load. If charging is managed to occur during off-peak periods, EV load can “fill valleys” in load without increasing overall capacity requirements.⁵⁹ Similarly, EV load can be shifted to facilitate the integration of variable generation from renewable sources. EVs with larger

⁵⁵ ChargePoint Initial Comments at 1.

⁵⁶ IIEC Reply Comments at 3.

⁵⁷ MMC Initial Comments at 3-4.

⁵⁸ *Id.* at 4.

⁵⁹ Sierra Club and NRDC Initial Comments at 6.

batteries have potential to provide battery back-up services to buildings or to the grid in times of strain supporting resilience. Flexible EV load, is a critical tool to support the integration of variable generating resources that may be underutilized. Shifting EV demand to complement renewable production can limit curtailment.⁶⁰

Tesla states that EVs can provide benefits to all ratepayers. EV load has unique characteristics in that it is distributed and flexible; it can be shifted to different times of the day when costs of the electric grid are lowest. EV charging patterns that do not increase the utility system's peak are beneficial load complementing demand reducing activities such as reducing overall demand via energy efficiency.⁶¹

In California, with the highest EV ownership rates of any state, the incremental demand that these EVs add to utilities' system is negligible. The utilities found that over the last five years, the total amount of utility expenditures for system updates due to EVs accounted for only \$610,000 of over \$5 billion in distribution upgrades.⁶² That is less than 0.02 percent. With minimal system planning or programs in place for EVs, the added load, mitigated by its flexibility and distribution, is beneficial to energy efficiency goals.

UCS states that even without vehicle-to-grid integration, the flexibility of EV charging load can be managed in a way that smooths power generation ramping, reduces extreme peaks in load, and better incorporates renewable energy generation on the grid.⁶³ USC recommends to accomplish these goals through a combination of price signals like time of use rates, demand response programs, and other managed charging arrangements that encourage off-peak charging.⁶⁴

⁶⁰ Id.

⁶¹ Tesla Initial Comments at 4.

⁶² Id.

⁶³ UCS Initial Comments at 2.

⁶⁴ UCS Initial Comments at 2.

B. Identify best charging practices and whether and how they can relieve pressure on the grid during peak-demand times, as well as relieve pressure on individual circuits.

ABB states that generally, owners charge their EVs at home during off-peak times at night, which is beneficial to the grid.⁶⁵ ABB states that well thought out EV charging rates can incentivize EV owners to begin charging after the evening peak.⁶⁶ According to ABB, drivers can easily shift their charging time via smart chargers tied to smart apps or program charging times directly in their vehicle.⁶⁷

ABB explains that managed charging (“V1G”) can be implemented with existing intelligent software tied to charging infrastructure and allows utilities to optimize the rate of charging based on load conditions and driver preferences.⁶⁸

ABB further states that well-tailored rate structures can incentivize EV owners to use their cars for grid services like voltage and frequency regulation, which could help maintain power quality on the distribution system.⁶⁹

ATE states that key to grid management is grid-to-vehicle charging practices that avoid increasing peak loads on the grid at certain points of the day. These practices can be incented by including price signals or time-of-use rates on a whole home or separately metered basis in tariffs and through customer education on “smart charging.”⁷⁰

ChargePoint encourages the Commission to consider the variety of ways in which the new load stemming from increased adoption of EVs can be shaped to create widespread grid benefits through electric rate design and load management techniques. ChargePoint is aware that the types and levels of benefits to the grid from EV charging

⁶⁵ ABB Initial Comments at 3.

⁶⁶ Id.

⁶⁷ Id.

⁶⁸ Id.

⁶⁹ Id.

⁷⁰ ATE Initial Comments at 3.

taking place under an energy management program will vary greatly by EV charging use case.⁷¹

ChargePoint encourages the Commission to “right-size” the rate design and load management approach for each use case weighing factors such as potential coincidence with peak load, absolute proportion of charging in such use case, EV driver’s flexibility in charging time and requirement, program complexity, and alignment of incentives throughout the EV charging ecosystem.⁷² Regarding best charging practices, ChargePoint argues three points. First, residential charging is perfectly suited for demand-side management programs due to the long dwell times available for charging, the ability to shift charging within that time period, and the EV driver typically serving as their own “site host”. Furthermore, charging at home is by far the location where the most EV charging will occur. One analysis conducted through the Idaho National Labs found that, on average, EV drivers charged their vehicles at home 64% of the time. In addition, numerous studies have shown that residential charging is extremely responsive to price signals through TOU rates.⁷³

Second, fleet charging is an ideal use case to support demand-side management and smart charging of EVs. This is due to long dwell times, certainty around vehicle operational needs, and the direct relationship between the vehicle’s owner and the charging station’s owner.⁷⁴

Lastly, ChargePoint argues that workplace charging presents opportunities to shape charging during the day due to the extended dwell times and repeat users of such charging stations. A study also found that approximately 33% of EV charging is conducted

⁷¹ ChargePoint Initial Comments at 2.

⁷² Id.

⁷³ Id. at 3.

⁷⁴ Id.

at work.⁷⁵ Workplace charging can be incentivized to avoid early morning peaks or to serve as a “sponge” for overgeneration of solar in the middle of the day.⁷⁶

ComEd states that charging managed through smart chargers that are integrated to distributed energy resource management systems (“DERMS”), and tied into ComEd’s advanced distributed management systems (“ADMS”) may help reduce peak demand in localized areas as well as the broader region.⁷⁷ In addition, incentives, whether economic or in describing the environmental impact of charging, could also support this effort. EVs supported by these additional technologies may be enabled to participate in strategies such as demand response, peak load shifting, and peak load shaving. Demand Response is achieved through reducing the connected EV load on the charging stations, peak load shifting through charging during off peak hours, V2G during peak hours, and by participating within aggregated DER models. EVs may also provide peak load shaving by meeting the load within the distribution system and reducing the peak load as observed at the Regional Transmission Organization (“RTO”) level.⁷⁸

IIEC agrees that it is imperative to attempt to minimize any detrimental effects that EVs may have on grid reliability and resiliency.⁷⁹ This is best accomplished, IIEC argues, through the use of tariff rate designs that incentivize charging during off-peak times to the extent possible and within cost of service principles. In the cases of public fast-charging stations catering to EV owners who require a quick charge on-the-spot and cannot or will not wait until off-peak times, IIEC notes that this could increase local or grid-wide distribution or power supply capacity needs and therefore have a detrimental impact on grid reliability and resiliency. Thus, IIEC contends that the cost to developers or owners

⁷⁵ ChargePoint Initial Comments at 3.

⁷⁶ Id.

⁷⁷ ComEd Initial Comments at 3.

⁷⁸ Id.

⁷⁹ IIEC Reply Comments at 2.

of such stations should reflect the cost of enhancements to the grid necessary to maintain grid reliability and resiliency.⁸⁰

Tesla states that research has shown that 80% of EV charging occurs at home which is different than driving to a gas station for fuel.⁸¹ Most cars sit idle for more than 20 hours a day when people are at stores, work, or at home presenting an opportune time to charge a vehicle. Tesla supports a “Charge where you Park” philosophy with charging options available at home, work, around town where people shop and dine, and along highway corridors.⁸² Tesla advocates for a Level 2 charge at home in evenings when excess grid capacity is greatest as the best charging practice.⁸³ Access to Level 2 charging managed through TOU rates properly designed can serve as the building block for any grid integration strategy.⁸⁴

Workhorse states that charging practices of electric delivery fleets are inherently suited to relieve pressure on the grid during peak-demand times.⁸⁵ Workhorse explains that EV delivery fleets typically operate during the day and are charged over night or programmed to charge during other off-peak times with Level 2 EVSE.⁸⁶

a. Describe whether and how transportation electrification in the public and non-residential sectors will affect the load on the electric grid.

ABB states that fleet charging will create larger demand loads in specific locations but utilities and technology providers have a lot of experience addressing new significant loads.⁸⁷ ABB states that larger loads can be integrated onto the grid.⁸⁸ While grid updates may be required in some instances, on-site battery storage might be a better way to

⁸⁰ IIEC Reply Comments at 3.

⁸¹ Tesla Initial Comments at 4.

⁸² Id.

⁸³ Id.

⁸⁴ Id. at 9.

⁸⁵ Workhorse Initial Comments at 1.

⁸⁶ Id. at 1-2.

⁸⁷ ABB Initial Comments at 4.

⁸⁸ Id.

manage demand in others.⁸⁹ ABB indicates that it is engaged in some pilots that pair onsite storage with EV charging and many fleet operators are evaluating onsite solar generation to reduce demand.⁹⁰

Ameren submits that until V2G capability is readily available, an electric vehicle resembles many other types of end-use-device loads.⁹¹ The size of the load the EV places on the grid is dependent on the speed at which it is charged, and varies from minimal (120 volt Level 1 charging), to slight (240 volt Level 2 charging), to moderate (Level 3 Direct Current Fast Charging (“DCFC”)), to substantial (clusters of charging stations or specific charging equipment for larger commercial applications).⁹² Ameren states that the effect of these types of loads on the overall grid, or on a specific circuit, is dependent on the location, type, and time of charging. Ameren argues that any mechanism that encourages charging at times that do not add to peak demand or that otherwise help to balance load with available generation on the grid or on a specific circuit would be beneficial to the grid. In addition, Ameren claims that the electric distribution utility is uniquely positioned to best understand how the installation of charging equipment can affect the grid in specific locations. Therefore, Ameren states that it would be beneficial for the utility to partner with local, regional, and state entities to strategically plan for charging station deployment to best leverage the existing electric infrastructure in an efficient and cost-effective manner and ensure potentially under-served areas are considered.⁹³ Ameren Illinois declares that it is confident that it can manage its system in a manner that avoids any adverse effects associated with the installation of EV chargers as EV markets continue to grow and evolve.⁹⁴ That said, Ameren states that partnerships

⁸⁹ ABB Initial Comments at 4.

⁹⁰ Id.

⁹¹ Ameren Initial Comments at 5.

⁹² Id.

⁹³ Id.

⁹⁴ Id. at 5-6.

and strategic planning would certainly prove valuable in efficiently managing the impact of EVs on the electrical grid.

ChargePoint argues that while publicly available charging at all levels is important for any charging ecosystem, it is the least optimal use case for demand-side management programs for a few main reasons. First, a very small percentage of total EV charging is, or will be, conducted at publicly available stations. Only 2-3% of charging taking place outside of home and workplace.⁹⁵ Second, there is an inherent difficulty in aligning the incentives between the site host, the transient EV driver, who may or may not be a native utility customer, and the utility.⁹⁶ Finally, drivers that plug into publicly-accessible EV charging stations are often relying on a quick charge to get back on the road. Any load curtailment or interference with their “refueling” would result in a poor driver experience and significantly impede EV adoption.⁹⁷

ComEd believes that transportation electrification in the public and non-residential sectors will add to the total load on the electric grid and can be classified as beneficial electrification. A properly planned process, and optimally designed implementation of transportation electrification, will provide a better means of control and offer the ability to use the increased load to integrate renewable energy and distributed energy. A “bottom-up” approach with feeder level analysis would be needed to help relieve potential local loading issues that EVs might cause on the system. Pricing mechanisms could also support and influence customer charging habits, and therefore support increased transportation electrification.⁹⁸

⁹⁵ ChargePoint Initial Comments at 3.

⁹⁶ Id.

⁹⁷ Id. at 4.

⁹⁸ ComEd Initial Comments at 4.

C. Describe whether and how development of additional charging infrastructure will affect grid reliability and resilience.

ABB states that while EVs bring new loads to the grid, intelligent charging infrastructure with well thought out rate structures can turn the additional loads into grid assets and improve grid reliability and resilience.⁹⁹

Ameren opines that until V2G capability is further commercialized, the effect additional charging infrastructure will have on grid reliability and resilience will be dependent on the specific location, size, and operation of the charging infrastructure, and the capabilities of the local distribution grid to which it is connected.¹⁰⁰ Assuming appropriate grid upgrades are made to accommodate the anticipated load patterns of the charging infrastructure, Ameren argues that if appropriate mechanisms are in place to encourage charging at times that do not add to peak demand or that otherwise help to balance load with available generation on the grid or on a specific circuit, the effect on grid reliability and resilience would be minimal.¹⁰¹

ATE states, additional grid infrastructure to accommodate EVs should have no direct impact.¹⁰² Investments in these capital additions to the distribution system should be regarded as a distributed energy resource that could provide benefits to the end-use consumer and the distribution grid.¹⁰³ ATE urges that the key issue for grid management is to encourage and adopt charging practices which avoid the increase of peak loads on the grid at certain points during the day, commonly known as grid-to-vehicle charging practices.¹⁰⁴ This can involve tariff changes that incentivize certain charging habits, or general customer education.

⁹⁹ ABB Initial Comments at 4.

¹⁰⁰ Ameren Initial Comments at 6.

¹⁰¹ Id.

¹⁰² ATE Initial Comments at 3.

¹⁰³ Id.

¹⁰⁴ Id.

ChargePoint argues that the development of additional charging infrastructure can readily support ongoing grid reliability and resilience through the implementation of utility programs that collect EV charging data, encourage the deployment of networked charging solutions, and develop new rates that facilitate the deployment of fast chargers by commercial site hosts and encourage EV charging at times that are beneficial to the grid.¹⁰⁵

IIEC states that while the EV industry is nascent, the market potential for electric vehicles is significant.¹⁰⁶ IIEC indicates that penetration of EVs will be based on a number of factors, including capital costs, advances in technology, governmental mandates or incentives, and customer preference. The timing of the development and proliferation of EVs, if ever, is simply unknown at this time, according to IIEC. IIEC notes that more uncertain is whether, and to what extent, the regulated delivery systems and activities of Illinois utilities will be affected by the potential increase in loads on the delivery system.

IIEC indicates that most uncertain is the question of whether the traditional regulatory structure really will need to be modified to accommodate any changes caused by additional EV load, and if so, what changes may or may not be required to modify the regulatory structure and the Commission's authority and role.¹⁰⁷ IIEC has seen no evidence that the traditional regulatory structure is incapable of properly addressing the shift in electrical usage patterns that may result from expanded penetration of EVs.

Tesla notes that current EV penetration is at less than 5 percent of all vehicles and studies demonstrate EV integration impact on the distribution grid is minimal.¹⁰⁸ For DCFC sites, such as Tesla's Superchargers, the majority are separately metered and go through a new service request process like every other commercial customer. The utility

¹⁰⁵ ChargePoint Initial Comments at 4.

¹⁰⁶ IIEC Reply Comments at 1.

¹⁰⁷ Id.

¹⁰⁸ Tesla Initial Comments at 5.

determines whether upgrades are required, if required the customer may need to pay for such upgrade if it is more expensive than allowances outlined by utility tariffs.¹⁰⁹

D. What other types of technology can be used to support grid reliability and resilience with continued electrification of the transportation sector?

Ameren states that it deploys and studies various types of new technologies to support grid reliability and resiliency, as outlined in the various reliability and infrastructure investment plans it provides to the Commission.¹¹⁰ Ameren views efficient electrification of the transportation sector, in the absence of commercial V2G capabilities, the same as it views any other type of new load, so the same types of technologies to support grid reliability and resilience would apply.

ATE states that many types of new technologies can be used to manage new loads created by EVSE. EVSE can enable technologies like demand response and perhaps increased distributed storage. This touches on a threshold issue of how much charging will be grid-connected to the utility opposed to Level 1 charging not necessarily connected to the grid and subject to potential load management techniques.¹¹¹

ChargePoint notes that their stations and cloud services, and those provided by their competitors, provide the ability for independent station operators to conduct load management of the allowable power level in real time in response to price signals from the utility.¹¹² ChargePoint explains that EV charging networks can provide the ability for station operators to grant access rights to utilities to conduct demand response on their stations.¹¹³ Like any other utility demand response program, the site host participants would likely receive some incentive in exchange for offering this capability. ChargePoint provides an example of their own capabilities, stating that they offer the ability to utilize

¹⁰⁹ Id.

¹¹⁰ Ameren Initial Comments at 6.

¹¹¹ ATE Initial Comments at 4.

¹¹² ChargePoint Initial Comments at 4.

¹¹³ Id.

standards-based application programming interfaces, or APIs, to automatically send demand response commands to the ChargePoint Cloud and control stations in the field.¹¹⁴

ChargePoint argues that with existing technologies provided by networked charging solution providers, utilities can easily integrate with a variety of platforms (like smart thermostats) to issue load shedding commands, confirm response, and analyze charging data. In addition to load shedding events, utility programs can also use price signals to residential or commercial customers of record that host charging stations to encourage off-peak charging of EVs.¹¹⁵

ChargePoint recommends that the Commission encourage utilities to explore demand side management programs targeted at reducing system peak, relieving distribution system congestion, and supporting renewable integration via smart charging at the home as an initial phase. ChargePoint also recommends that utilities be encouraged to work in concert with automakers and the EV charging industry to develop solutions that leverage existing “consumer electronics” products and driver interfaces while being agnostic to specific vendors given the nature of the customer sited technologies being discussed.¹¹⁶

ComEd states that the following technologies could be used to support grid reliability and resiliency:

- Managed control of EV charging technologies, integration with DERMS and ADMS, and high-speed, low-latency communications networks, which enable the managed control technologies along with improved protection and control schemes.¹¹⁷
- Technologies that allow for wide-area observability of smart chargers and Extra Fast Chargers (“XFC”), which provide granular management capabilities, and the ability to visualize and monitor the system through Real Time Distribution State Estimation and 3 phase unbalanced Power Flow.¹¹⁸

¹¹⁴ ChargePoint Initial Comments at 4.

¹¹⁵ Id. at 5.

¹¹⁶ Id.

¹¹⁷ ComEd Initial Comments at 4.

¹¹⁸ Id.

- Advanced cybersecurity measures, including fingerprinting technologies and Blockchain.¹¹⁹
- Microgrids, which could benefit from energy resources like EVs.¹²⁰

Tesla advocates to solve fundamental issues impacting EV ownership first. The EV market is still in its early stages of development, and adoption is reliant upon consumer investment in these vehicles.

Conversely, Tesla discourages programs and solutions with potential to increase the cost of EV ownership. Piloting opportunities to pair renewables including solar and storage will be helpful for future integration but should not be a primary focus today. Complex charging programs with software and hardware requirements to do more sophisticated load management at large scales is unnecessary until costs and benefits have been quantified and EV deployment reaches higher levels. Demand response programs should be designed with a specific end-result providing benefits to ratepayers and the grid while agnostic to the technology that is utilized to achieve the end goal.¹²¹

E. Do vehicle-to-grid capabilities need to be enabled in order for EVs to provide grid support?

ABB states that vehicle-to-grid capabilities are easily implemented today as V1G, or non-bi-directional managed charging, where intelligent chargers can structure charging.¹²² ABB further assures that no major changes need to be made to vehicles, chargers, or facilities to enable managed charging.¹²³

ABB explains that vehicle-to-grid capabilities that employ V2G concepts use vehicle batteries as storage assets or to provide grid services, which utilizes bi-directional charging and are still in the early stages of development and piloting.¹²⁴

¹¹⁹ ComEd Initial Comments at 4.

¹²⁰ Id.

¹²¹ Tesla Initial Comments at 5.

¹²² ABB Initial Comments at 4.

¹²³ Id.

¹²⁴ Id.

Ameren believes that vehicle-to-grid capabilities need to be enabled in order for EVs to provide grid support. Ameren suggests that without V2G EVs resemble many other types of end-use-device loads.¹²⁵

ATE states that V2G capabilities are desirable under grid management circumstances but not necessary for EV owners or utilities in early stages of adoption.

ChargePoint states that from a communications standpoint, their stations already have the capability of communicating through standardized communication protocols, such as OpenADR2.0b.¹²⁶ One of the more commonly discussed “two-way” V2G functions is the ability of the EV to export energy back onto the grid for the purposes of providing frequency regulation or other ancillary services.¹²⁷ There are several challenges to the mass deployment of this type of functionality, including: vehicle battery warranty concerns, vehicle technological capabilities, metering and telemetry requirements, interconnection rules to ensure safe grid operations, comprehensive control algorithms, and contractual requirements that would provide sufficient value to all parties.¹²⁸

Last and potentially most importantly, ChargePoint argues that while V2G promises interesting capabilities in the future, “one-way” energy flow management of EV charging already exists. This currently-available load management can provide a clear majority of the potential grid benefits associated with transportation electrification.¹²⁹

ComEd states that the ability of EVs to contribute to the grid is dependent on the ability to control charging and discharging. Such control is possible through grid controls, because V2G capabilities enable EVs to send energy back to the grid, helping to provide intermittent generation firming capabilities, enhanced peak load shaving, and offer non-spinning reserve support on the distribution system.¹³⁰

¹²⁵ Ameren Initial Comments at 6.

¹²⁶ ChargePoint Initial Comments at 5.

¹²⁷ Id.

¹²⁸ Id.

¹²⁹ Id.

¹³⁰ ComEd Initial Comments at 4.

IIEC notes that some parties appropriately point out that the level of vehicle-to-grid technology necessary to allow EVs to reliably serve as a battery source for the utility grid is not yet fully developed.¹³¹ (See Initial Comments by Sierra Club and NRDC and ChargePoint). Therefore, IIEC argues that it is premature at this time to attempt to quantify the benefits the utility may receive by drawing power from EVs at times of local grid need. IIEC specifically disagrees with any party that suggests EVs should be considered a type of DER. (See, e.g., Initial Comments by Alliance for Transportation Electrification and Sierra Club and NRDC).

Sierra Club and NRDC explain that it is important to distinguish related terms and concepts such as “vehicle-grid integration” and “vehicle-to-grid capabilities.” “Vehicle-grid integration” encompasses the variety of potential pathways for EVs to provide grid services.¹³² EVs have a potential to transmit energy back to the grid, often referred to as “vehicle-to-grid,” or “V2G,” representing one type of vehicle-grid integration. The necessary technology for bi-directional power flow is still emerging.¹³³ The more widely proven vehicle-grid integration pathways sometimes referred to as “V1G” are (1) the use of time-variant electricity rates and (2) managed charging. Using these tools to “flex” EV load can “relieve pressure on the grid during peak-demand times.”¹³⁴

Regarding time-variant rates, Sierra Club and NRDC state that they provide one well-tested means to shift EV charging times. By charging higher prices in times of peak demand and lower prices in off-peak times, time-of-use rates are effective at shifting EV load and provide EV owners with easy to-understand price signals without requiring customers to monitor real-time rates.¹³⁵

Regarding managed Charging, Sierra Club and NRDC note that smart charging enables increased adoption of EVs without new grid infrastructure and promotes grid reliability by allowing a central operator to curtail EV charging during peak demand.¹³⁶

¹³¹ IIEC Reply Comments at 2.

¹³² Sierra Club and NRDC Initial Comments at 6.

¹³³ Id.

¹³⁴ Id. at 7.

¹³⁵ Sierra Club and NRDC Initial Comments at 7.

¹³⁶ Id.

Tesla recommends that before designing any programs to enable vehicle-to-grid capabilities, standard definitions of the terms associated with vehicle grid integration (“VGI”) including distinguishing between V1G (one-way) and V2G (bidirectional) need to be defined in a standard glossary of terms. Subsequently, what types services of grid support can be provided by EVs and under what specific charging use cases (work, Home, fleet, etc.) should be investigated.

Tesla argues, today, creating customer price signals via TOU rates and encouraging Level 2 charging where vehicles are parked for several hours, will provide the most valuable grid benefits for integrating EVs.¹³⁷

UCS indicates that regarding vehicle-to-grid integration, EVs can serve as a distributed energy resource.¹³⁸ The UCS refers to “Charging Smart” (Appendix B) for more information on how smart charging designs benefit the grid at local and ISO levels, especially with regard to the incorporation of renewable energy generation.¹³⁹

F. What control by the utility is necessary to ensure reliability and efficient operation of the grid?

Ameren claims that until V2G capability is commercially available, it views EV charging similar to any other type of new load.¹⁴⁰ Ameren argues that any appropriate mechanism that encourages charging at times that do not add to peak demand or that otherwise helps to balance load with available generation on the grid or on a specific circuit would be beneficial to the overall reliability and efficient operation of the grid. Ameren suggests that these mechanisms in the future could include, but are not limited to, educating customers as to the appropriate times to charge to better support the grid, further proliferation of real-time or time-of-use prices, optimized charging through

¹³⁷ Tesla Initial Comments at 6.

¹³⁸ UCS Initial Comments at 2

¹³⁹ Id.

¹⁴⁰ Ameren Initial Comments at 7.

communication with charging stations or directly with EVs, and/or more direct load control programs as necessary and economical.¹⁴¹

ATE states that the distribution utility should have access to location of EVSE and charger type to plan for grid improvements and operate the grid. For pilots, utilities need full access to data generated by EVSE funded by utilities, on a royalty and IP free basis to assess consumer behavior and grid impacts.¹⁴²

ChargePoint argues that utilities can be granted the ability to conduct load management without having to own the EV charging equipment itself. In addition to grid needs, load management programs should also be designed to account for the needs of drivers, riders, and EV charging site hosts.

ComEd states that EVs connecting to the grid as conventional load do not impact reliability of the grid by themselves. However, with control and V2G capabilities, the utility should be able to monitor, visualize, and manage the wider region as well as localized areas so that it can maintain real-time reliability, as well as safe operation of the system.¹⁴³

Tesla notes that in the context of EVs and charging infrastructure, the utility needs to have general insight and data on vehicle purchases and usage behavior. Currently, utilities lack visibility about who owns an EV in their service territory and charging behavior. Foundational insights into EV customer trends are important for utilities as well as other stakeholders, such as charging station developers. Utilities could offer customers a nominal rebate for registering their EV with the utility to increase visibility of EV location. ComEd provides EV registration. Once there is EV ownership visibility electricity usage patterns can come through the existing meter infrastructure.¹⁴⁴

¹⁴¹ Id.

¹⁴² ATE Initial Comments at 4.

¹⁴³ ComEd Initial Comments at 5.

¹⁴⁴ Tesla Initial Comments at 7.

The UCS states that beyond the traditional model of investment, utilities are well positioned to contribute to investments in EV charging infrastructure for several reasons.¹⁴⁵

First, the UCS states that utilities have the core competencies required for EV charging infrastructure investments as they are skilled in designing and deploying physical electricity infrastructure.¹⁴⁶ UCS states that utilities also have critical experience in designing rates, demand response programs, and other charging management strategies.¹⁴⁷

Next, UCS states that utilities have the resources to undertake programs that will contribute substantially to infrastructure needed to support and promote electric transportation.¹⁴⁸

Last, UCS states that utilities have a relationship with customers they can leverage to promote their program.¹⁴⁹ The UCS warns that if sensible accommodations are not made to address added loads, the electric system and ratepayers could face increased peak loads, steeper generation ramps, and stressed distribution systems.¹⁵⁰

In his Reply Comments, Dr. Santini notes that for vehicles used for work commuting, there is a need for long-duration, low power charging at a single workplace location.¹⁵¹ Dr. Santini further states that if the workplace chose to install L2 chargers and vehicles spent less time charging, then fewer vehicles would be connected to the grid at any single point in time and lunchtime disconnections would become common, creating a “trough” in supply of connected daytime capacity.¹⁵²

¹⁴⁵ UCS Initial Comments at 1.

¹⁴⁶ Id.

¹⁴⁷ Id.

¹⁴⁸ Id.

¹⁴⁹ Id.

¹⁵⁰ Id. at 2.

¹⁵¹ Santini Reply Comments at 3.

¹⁵² Id.

G. Identify cybersecurity implications, if any, of widespread EV adoption.

ABB states that EVs offer an incredible opportunity to improve quality of life along with reducing the many costs associated with an antiquated transportation system, but it must be deployed in intelligent, secure ways with the strongest cybersecurity controls inherent in all planning and deployment.¹⁵³

ABB explains that deployment of EV charging equipment requires widespread infrastructure to meet market demand, especially at places like homes, public and private establishments, near highways, or other places where cars travel.¹⁵⁴ ABB further states that synchronous charging of EVs at a large charging hub with high power charging infrastructure may cause adverse impacts to the distribution system that could lead to voltage instability, phase imbalance, and heating problems.¹⁵⁵

ATE states that cyber security is an important issue that utilities and vendors must address seriously, providing adequate security to mitigate risks by adhering to current engineering standards and adopting best practices similar to AMI cybersecurity challenges.¹⁵⁶ While North American Reliability Corporation – Critical Infrastructure Protection (“NERC-CIP”) standards apply at the bulk electric system level, developed by NERC and overseen by the Federal Energy Regulatory Commission, no similar mandatory standards exist for Supervisory Control and Data Acquisition and Operational Technology equipment at the distribution level, both for utility owned assets and the supply chain and vendors whom utilities procure from.¹⁵⁷

ATE suggests that the overall framework created at the bulk electric system may be useful for the ICC.¹⁵⁸ New industries active in the EV space may also be useful

¹⁵³ ABB Initial Comments at 4.

¹⁵⁴ Id. at 5.

¹⁵⁵ Id.

¹⁵⁶ ATE Initial Comments at 4.

¹⁵⁷ ATE Initial Comments at 4.

¹⁵⁸ Id. at 5.

resources such as the automotive sector and the IT industry involved in autonomous and semi-autonomous vehicles.

ComEd states that EVs and the electrification of the transportation sector are supported by networked electronic technologies.¹⁵⁹ As these communication-enabled and smart technologies integrate, and interact with the grid, they have a potential to cause widespread issues.¹⁶⁰

a. Discuss the potential for EVs to be a vector for smart grid control network penetration.

ABB urges that charging infrastructure procurement include vendor evaluations for comprehensive software security controls at data transmission and data storage levels.¹⁶¹ ABB states that it defers to vehicle makers and utilities on their domain expertise with related vehicle and grid security respectively.¹⁶²

ComEd believes that EVs could be managed and coordinated in a smart manner through DERMS and ADMS in localized areas and wider regions to help control the grid with the help of fast speed communication infrastructure.¹⁶³ Combined, these technologies that provide granular monitoring, visualization, and control would help increase reliability and resiliency, as well as, reduce losses, and optimize energy on the grid.¹⁶⁴

b. Discuss the potential for EVs to be a vector for causing physical disruptions if charging and discharging is coordinated in a malicious manner as part of a botnet under the control of malicious actors.

Ameren states that the security of any network that interacts directly with electric vehicles or associated charging stations needs to be a high priority.¹⁶⁵ Until V2G capability

¹⁵⁹ ComEd Initial Comments at 5.

¹⁶⁰ Id.

¹⁶¹ ABB Initial Comments at 5.

¹⁶² Id.

¹⁶³ ComEd Initial Comments at 4.

¹⁶⁴ ComEd Initial Comments at 5.

¹⁶⁵ Ameren Initial Comments at 7.

is commercially available, and/or there is a need for the utility to communicate with individual charging stations or EVs, Ameren argues the cybersecurity implications of widespread EV adoption to the overall grid are minimal as there would not be a direct link to the utility's systems. As utility communication to EVs and/or charging stations develops, Ameren reasons that the same robust cybersecurity practices, which the utility already deploys with all other devices that the utility monitors and controls, need to be deployed.¹⁶⁶

ComEd indicates that because EVs applications and infrastructure present the ability for control through networked communication systems, there is a potential for EVs to be used in a malicious manner.¹⁶⁷ Therefore, advanced cybersecurity components, monitoring, visualization, and management applications are needed on local and wider distribution networks to observe, identify, and mitigate any potential issues.¹⁶⁸

Barriers:

ATE recommends the Commission review "The Future of Transportation Electrification: Utility, Industry and Consumer Perspectives," published by Lawrence Berkeley National Laboratory ("LBNL").¹⁶⁹

ATE states that there are many barriers with more rapid adoption of EVs and accelerated deployment of EV infrastructure including: consumer awareness, education and outreach, and range anxiety.

ATE states that consumer awareness is one of the largest barriers to greater EV adoption including consumers general lack of awareness of the EV market and how many and what type of light duty EVs are available to drive. For example, in California, the

¹⁶⁶ Id.

¹⁶⁷ ComEd Initial Comments at 5.

¹⁶⁸ Id.

¹⁶⁹ ATE Initial Comments at 5.

largest EV market, less than one-half of all surveyed consumers can name a specific EV.¹⁷⁰

ATE states that education and outreach includes educating automobile dealers not trained to sell or advise on EVs. This lack of knowledge also extends to utilities. Utilities with best practices to address such issues have web portals to provide general and specific information to customers.¹⁷¹

A. Describe regulatory barriers to increased electrification of the transportation sector.

ABB states that the most pressing regulatory barriers include rate design, “make-ready” infrastructure, and siting.¹⁷²

Ameren notes that utilities are generally discouraged from engaging in activity that encourages the additional use of service.¹⁷³ Yet, efficient electrification, of which EV adoption is a significant subset, can provide environmental and consumer benefits. Ameren argues that if utility advertising regarding the benefits of EVs is deemed “promotional,” utilities may lose the opportunity to recover the expense to educate customers about the benefits of efficient electrification. Without cost recovery, Ameren argues that utilities are much less likely to engage in the activity and adoption is less likely to grow as rapidly as it otherwise would. Ameren argues that utilities engaged in promotional advertising of EVs should be permitted recovery of reasonable advertising expense.¹⁷⁴

ChargePoint indicates that regulatory uncertainty is a key regulatory barrier to increased electrification of the transportation sector. Illinois has already taken an essential first step by clarifying that the provision of EV charging by non-utility third parties is a

¹⁷⁰ Id.

¹⁷¹ Id. at 6.

¹⁷² ABB Initial Comments at 5.

¹⁷³ Ameren Initial Comments at 8.

¹⁷⁴ Ameren Initial Comments at 8.

service, and not the sale of electricity.¹⁷⁵ ChargePoint also argues that uncertainty about the appropriate role, or roles, for regulated electric utilities in the competitive EV charging market is also a barrier to increased electrification. Without guidance from the Commission, utilities will not have clear signals to support the development of programs that advance transportation electrification in Illinois while simultaneously supporting customer choice and the competitive EV charging market.¹⁷⁶

ComEd believes that efforts to increase transportation electrification would benefit from clear regulatory and public policy direction. Currently, the lack of certainty pertaining to the recovery of utility-owned EV infrastructure and charging stations is a regulatory barrier for utilities.¹⁷⁷ Beneficial electrification being considered as a part of energy efficiency programs will also support in the increased electrification of the transportation sector.¹⁷⁸

CUB/EDF state that regulatory barriers may include the impact of charging demands on the grid and the impact of increased charging—especially during peak times—on the existing grid.¹⁷⁹

IIEC argues that it is possible, though far from certain, that at some point in the future investment in and operation of the distribution delivery service system of the regulated utilities may be significantly impacted by EVs. Even less certain, however, is whether the current regulatory mechanisms are in any way inadequate to cover changes in delivery service costs or infrastructure investments needed by the regulated utilities.¹⁸⁰

Sierra Club and NRDC state that it is critical to resolve (1) the regulatory treatment of third-party non-utility owners and operators of EV charging stations; and (2) the role for utilities with respect to EV system planning, load management, and infrastructure deployment. In Illinois, the legislature has provided certainty on the first question, clarifying that “[a]n entity that furnishes the service of charging electric vehicles does not

¹⁷⁵ ChargePoint Initial Comments at 6.

¹⁷⁶ Id.

¹⁷⁷ ComEd Initial Comments at 5.

¹⁷⁸ Id.

¹⁷⁹ CUB/EDF Initial Comments at 3.

¹⁸⁰ IIEC Initial Comments at 1.

and shall not be deemed to sell electricity and is not and shall not be deemed a public utility notwithstanding the basis on which the service is provided or billed.” Sierra Club and NRDC indicate that there is lingering uncertainty on the role for electric utilities, particularly as to whether utilities may invest in EV charging infrastructure, and if so, whether cost recovery may be available and what the process would be for regulatory review. Sierra Club and NRDC note that Commission guidance on the scope of the utility role and the process for regulatory review is critical to solving those infrastructure and integration challenges, and they hope that this process will result in such action.¹⁸¹ Sierra Club and NRDC argue that the utilities have a role to play in transforming the market for EVs and there is no consensus as to the ‘right’ model to accomplish transformation, thus flexibility is essential at this early stage.¹⁸²

Tesla indicates that there are several factors that impact both regulatory and economic barriers for transportation electrification. This includes the following items: investment in make-ready infrastructure; ability for utilities to earn a rate of return or recover the costs on make-ready infrastructure investments; price signals via electric rates for nascent markets; total cost of ownership for EVs and charging infrastructure; and new service requests and development process for charging infrastructure deployment.¹⁸³

Workhorse states that regulatory barriers to the adoption of EVs include the cumbersome process, lengthy waiting period, and timing uncertainty for obtaining permits under local codes for the installation of EVSE infrastructure in some jurisdictions.¹⁸⁴

a. Identify possible solutions to overcome regulatory barriers.

¹⁸¹ Sierra Club and NRDC Initial Comments at 8.

¹⁸² Sierra Club and NRDC Initial Comments at 10.

¹⁸³ Tesla Initial Comments at 7.

¹⁸⁴ Workhorse Initial Comments at 2.

ABB states that utilities should be able to support make-ready plans that aid safe and reliable grid connections and recoup the associated costs through careful and well-designed rate-based plans.¹⁸⁵ ABB notes that customer rates should not necessarily be impacted, as utilities will have new revenue from connected EVs.¹⁸⁶ ABB also states that cities and communities should streamline the permitting process to help infrastructure deployments move more efficiently.¹⁸⁷

Ameren suggests that the Commission can clarify that promotion of EVs is a permissible activity and recovery of related reasonable advertising expense will be allowed.¹⁸⁸ Ameren notes that the Commission could also clarify that utility efforts to inform consumers of EV options, or undertake practices that promote their adoption, are not actions that would constitute “promotional practices.” Ameren argues that advertising and promotional practice policies contained in ICC rules are intended to protect consumers - but with respect to EV adoption, there are clear societal and public policy benefits of EVs. Commission clarification could be accomplished through a determination that Parts 275 and 295 of the 83 Ill. Adm. Code do not apply to utility-sponsored efforts to increase public awareness and adoption of EVs. Or, Ameren states, if the Commission determined it necessary, it could go a step farther and grant declaratory rulings, issue waivers, modify rules, or approve specific tariff language - as appropriate to resolve any legal ambiguity with respect to specific undertakings.¹⁸⁹

ATE states that well-designed programs for consumer awareness and education with limits and Commission oversight should be “above the line” expenses and included in total revenue requirements.¹⁹⁰ The single most important reasons people mention for

¹⁸⁵ ABB Initial Comments at 5.

¹⁸⁶ Id.

¹⁸⁷ Id.

¹⁸⁸ Ameren Initial Comments at 8.

¹⁸⁹ Id. at 8-9.

¹⁹⁰ ATE Initial Comments at 6.

not purchasing an EV is lack of adequate charging infrastructure deployed and in the ground.¹⁹¹

ChargePoint recommends that the Commission issue clear guidance on the appropriate role for utilities in the competitive EV charging market and consider addressing feasibility and methods for using embedded metrology in devices such as charging stations.¹⁹²

ComEd states that possible solutions to overcome the regulatory barriers include (1) assurance of cost recovery for utilities for EV infrastructure and charging stations; and (2) clear policy direction regarding EVs and EV charging infrastructure.¹⁹³

CUB/EDF argues that incentives to lower system peaks could include new rate structures such as time-variant or dynamic rates, managed charging focused on lowest-cost times, and compensation for vehicle-to-grid capabilities and that such actions can financially benefit EV owners as well as promoting grid reliability and resiliency.¹⁹⁴

Tesla recommends that the Commission can provide guidance for the utilities to file EV program proposals to address barriers. Tesla notes that California's Regulatory code states: "Deploying electric vehicle charging infrastructure should facilitate increased sales of electric vehicles by making charging easily accessible and should provide the opportunity to access electricity as a fuel that is cleaner and less costly than gasoline or other fossil fuels in public and private locations."¹⁹⁵ Tesla argues that adopting similar guidance in Illinois would drive EV infrastructure deployment. Tesla recommends that single points of contact or a dedicated team at the utility to handle electric vehicle supply equipment service requests streamlines the development process. Furthermore, consultative site walks with utility engineers before submitting service requests can help inform site plans, reduce delays and lower costs.

¹⁹¹ Id. at 6.

¹⁹² ChargePoint Initial Comments at 7.

¹⁹³ ComEd Initial Comments at 6.

¹⁹⁴ CUB/EDF Initial Comments at 3.

¹⁹⁵ Tesla Initial Comments at 8.

Workhorse indicates that states should encourage and, to the extent possible, require local jurisdictions to streamline the application and review process for obtaining regulatory approval for the installation of EVSE by fleets.¹⁹⁶

B. Describe economic barriers to increased electrification of the transportation sector.

ABB states that vehicle rebates and incentives support the transition to EVs.¹⁹⁷ ABB notes that demand charges or tariffs make business models for charging very difficult, especially for DCFC, fleets, and medium and heavy-duty vehicle deployments.¹⁹⁸

Ameren submits that EVs typically have an increased upfront cost when compared to traditional internal combustion engine vehicles.¹⁹⁹ Consumers may consider costs associated not only with the purchase of the vehicle but also charging infrastructure or other infrastructure needed to make the use of the vehicle suitable to their standards. Additionally, Ameren states because EVs are a new technology, the lack of useable EVs on the used-car market may put the technology out-of-reach for some more financially-limited consumers.²⁰⁰

ATE states that there are several economic barriers including: (i) the relatively higher cost of an EV compared to an ICE vehicle; and (ii) potential EV owners incur additional costs to install some portion of make-ready costs, and Level 2 home charger in order to do home charging, because 80% of charging will take place at home.²⁰¹

ChargePoint argues that economic barriers to increased electrification of the transportation sector should be considered in terms of upfront (capital) and ongoing (operating) costs. ChargePoint also provides the following chart of barriers to increased electrification.²⁰²

¹⁹⁶ Workhorse Initial Comments at 2.

¹⁹⁷ ABB Initial Comments at 6.

¹⁹⁸ Id.

¹⁹⁹ Ameren Initial Comments at 9.

²⁰⁰ Id.

²⁰¹ ATE Initial Comments at 6.

²⁰² ChargePoint Initial Comments at 7.

Use Case	Barrier
Residential <i>Single Dwelling</i>	<ul style="list-style-type: none"> ● Lack of garage/dedicated parking ● Lack of EV-specific signals/load management to encourage off-peak charging ● Requirement for secondary utility meter for EV charge tracking & potential billing
Residential <i>Multifamily</i>	<ul style="list-style-type: none"> ● Lack of decision-making authority to install EVSE (e.g., permission from condo board) ● Technical/power challenges: insufficient capacity; distance to parking stall(s); etc. ● Restrictions on using advanced features in networked EVSE (e.g., power management to avoid capacity upgrades; embedded metrology to avoid cost of additional meters; etc.) ● Multi-Unit Dwellings (MUDs) have multiple use cases: shared vs assigned parking ● Lack of EV Ready requirement leads to higher retrofit installation costs ● Upfront cost of installation
Quasi-Public <i>Workplace</i>	<ul style="list-style-type: none"> ● Upfront cost for installation; ● Restrictions on using advanced features in networked EVSE (e.g., power management to avoid capacity upgrades; embedded metrology to avoid cost of additional meters; etc.) ● Regulatory clarity regarding treatment of non-utility energy-based sales for charging
Public <i>Level 2</i>	<ul style="list-style-type: none"> ● Upfront cost for installation; ● Municipal permitting/zoning requirements ● Regulatory clarity regarding treatment of non-utility energy-based sales for charging ● Lack of EV Ready requirement leads to higher retrofit installation costs
Public <i>DC fast charging (community)</i>	<ul style="list-style-type: none"> ● Upfront cost of equipment and installation ● Lack of available electrical capacity at existing sites and high cost to supply sufficient utility distribution service ● Regulatory clarity regarding treatment of non-utility energy-based sales for charging ● Electric interconnection costs ● Three different common charging connectors ● High operating costs of DC fast chargers due to low load factor & traditional, demand-based electricity rates
Public <i>DC fast charging (corridor)</i>	<ul style="list-style-type: none"> ● Upfront cost of equipment and installation and operation ● Regulatory clarity regarding treatment of non-utility energy-based sales for charging ● Access to appropriate site hosts with adequate amenities and safety ● Lower expected utilization along corridors ● Electric interconnection costs ● High operating costs of DC fast chargers due to low load factor & traditional, demand-based electricity rates
Overarching <i>Policy, regulatory, & industry</i>	<ul style="list-style-type: none"> ● Regulatory clarity regarding treatment of non-utility energy-based sales for charging ● Regulatory clarity regarding utility role in competitive EV charging market ● Rate structure options & mitigation opportunities for fast charging ● Ability to roam between networks

ComEd states that one of the primary economic barriers for the increased electrification of the transportation sector is the high up-front costs, such as the vehicle

purchase price (relative to traditional ICE vehicles) and the purchase and installation of charging equipment.²⁰³

CUB/EDF state that the upfront costs of electric vehicle purchase and electrical system upgrades to support charging infrastructure may be barriers to increased electrification.²⁰⁴

Siemens states that the most important factor in EV adoption is lowering the Total Cost of Ownership (“TCO”), in terms of economics and consumer convenience. The key hurdle to EV adoption is the TCO- the purchase price and cost of operation. Siemens argues larger market penetration can only be achieved if EVs become price competitive with ICE vehicles.²⁰⁵

Sierra Club and NRDC indicate that despite EVs main benefits, barriers to adoption still exists.²⁰⁶ A lack of charging infrastructure and lack of consumer education are hurdles to scaling light-duty transportation electrification. Without extremely high utilization rates, it is difficult for independent firms- whether they are hosts or Electric Vehicle Service Providers (“EVSPs”) themselves – to realize a profit in a reasonable timeframe. This problem is acute for DCFCs which are more expensive per unit than Level 1 or 2 charging stations today. Sierra Club and NRDC note automakers do not see themselves as making significant investments in charging stations nor is charging station deployment expected to become a core business of automakers. Automakers, governments, charging station companies and other entities deploying charging stations are facing a market coordination problem slowing the development of charging networks necessary to support EV growth. This market coordination problem, also known as the “chicken and egg” dilemma occur when the underdevelopment of one “networked” good leads to underdevelopment of another networked good.²⁰⁷ Low market penetration of charging stations inhibits EV market growth. Customers may be unwilling to purchase EVs if charging networks are underdeveloped and charging station providers need sufficient demand to build out a

²⁰³ ComEd Initial Comments at 6.

²⁰⁴ CUB/EDF Initial Comments at 3.

²⁰⁵ Siemens Initial Comments at 3.

²⁰⁶ Sierra Club and NRDC Initial Comments at 10.

²⁰⁷ Id. at 10.

charging network – resulting in an under-provision of charging stations. However, as charging stations are built out, the value of owning an electric vehicle increases and the EV market grows. This may attract private entities to deploy additional charging stations. Cornell University research supports these trends analyzing the network effect associated with quarterly EV sales in 353 metro areas, finding “increased availability of public charging stations statistically and economically impacts EV adoption decisions.”²⁰⁸

Workhorse indicates that a significant economic barrier to EV adoption by delivery fleets is the limited capital available to small business firms that are currently manufacturing electric trucks and vans.²⁰⁹ According to Workhorse, while many original equipment manufacturers (“OEMs”) have announced plans to begin manufacturing electric trucks, they are not in a position to compete against existing ICE models yet, as they are unable to produce enough trucks and vans to meet the potential demand for EVs.²¹⁰

a. Identify possible solutions to overcome economic barriers.

ABB states that enhanced rebates on EVs at state and regional levels will push the desirable adoption curve faster.²¹¹ ABB indicates that it is supportive of charging infrastructure rebates where deployments are well planned with an operational model, including uptime and performance metrics and similar accountability measures.²¹²

Ameren opines that there are probably many solutions that could address barriers.²¹³ Ameren observes that some more obvious solutions include - customer incentives and upstream incentives; public charging infrastructure; consumer awareness

²⁰⁸ Sierra Club and NRDC Initial Comments at 11.

²⁰⁹ Workhorse Initial Comments at 2.

²¹⁰ Id.

²¹¹ ABB Initial Comments at 6.

²¹² Id.

²¹³ Ameren Initial Comments at 9.

programs; tax credits and rebates; and incorporation of programs that increase public benefits while bringing EV access to underserved or disadvantaged areas.²¹⁴

ATE states that several projections point to a “tipping point” in early 2020’s when upfront purchase costs of an EV will become roughly similar to ICE vehicle. Technological changes and improvements will affect both vehicle types. On a Total Cost of Operating (“TCO”) basis, EVs will increasingly compete with ICE vehicles and likely become cheaper to own and operate in several years.²¹⁵

ATE states that solutions include continued cost reduction efforts by auto OEMs to bring upfront purchase price of EVs down, and efforts by battery developers to lower costs, and increase range. Also, various incentives are offered for EV purchase. Utility programs may be very effective in addressing economic barriers by cost-sharing initial infrastructure.²¹⁶

ChargePoint states that with regard to ongoing operating cost barriers, ChargePoint encourages the Commission to prioritize consideration for whether traditional, demand-based commercial rate structures are aligned with facilitating DCFC as the Illinois EV market grows.²¹⁷

ChargePoint explains that site hosts can potentially face very high demand charges despite low utilization in the early years, which effectively penalizes site hosts for providing DC charging services in earlier stages of adoption.²¹⁸ ChargePoint argues that several alternatives for cost recovery can be considered in any future evaluation of rate design specific to providing service to DCFC stations and to encourage more site hosts to deploy such stations by providing a more predictive and manageable operating cost structure. ChargePoint includes the following list of example solutions or alternatives

- Demand charges could be replaced with or paired with higher volumetric pricing to provide greater certainty for charging station operators with low utilization. This rate could be scaled based on utilization, time, or load factor as charging behavior changes over time with increased EV adoption.
- A retroactive and variable credit based on the difference of the effective

²¹⁴ Id.

²¹⁵ ATE Initial Comments at 6-7.

²¹⁶ Id. at 7.

²¹⁷ ChargePoint Initial Comments at 7.

²¹⁸ Id.

blended per kWh distribution charge, including demand charges, and an agreed upon target blended rate, multiplied by the volumetric energy throughput in a given billing cycle for commercial customers with dedicated EV charging stations. (e.g. Long Island Power Authority's proposal in New York Public Service Commission Matter No. 14-01299: PSEG Long Island Utility 2.0 PLAN)

- The bank of charging stations could be put on a separate meter in order to use a unique "EV charging" rate that is designed to reflect charging needs. Note: it is not necessary to separately meter every single charging station, since many charging stations have embedded metrology.
- A pilot rate could be developed specifically for fleet operators, particularly those that operate electric bus fleets that may charge overnight and provide time of use benefits to the grid.
- A demand charge "credit" could be applied for a period of time to qualifying service application that only provide power to support electric vehicle charging.
- The utility could consider pricing signals to the station operator, such as time-of-use or critical peak pricing.
- Utilities should factor in the overall EV load from all vehicles in its service territory and its benefit to the grid not just that metered at the DCFC. With increased EV adoption, there will be increased load, which could lead to greater grid benefits in the future.²¹⁹

ComEd states that incentives, such as rebates, subsidies and tax incentives, on the purchase or lease of the vehicle and the purchase and installation of charging equipment, are possible solutions to overcome economic barriers. In addition, education about the lifecycle economic advantages of EVs would be helpful to encourage potential vehicle buyers.²²⁰

Siemens states that by allowing utilities to participate in the provision of EV charging, the Commission has the ability to reduce costs of operation and maintenance, and therefore, improve cost attractiveness. Open markets allowing participation by all companies in a nascent market where capabilities of all players need to be fully leveraged are key policy goals to lowering the TCO. Utilities are well positioned to help drive EV adoption by maximizing benefits and minimizing costs.²²¹

²¹⁹ ChargePoint Initial Comments at 8.

²²⁰ ComEd Initial Comments at 6.

²²¹ Siemens Initial Comments at 3.

Workhorse suggests that the Illinois Commerce Commission can work with public bodies in other states to encourage public and private investments in EV manufacturing to accelerate electric delivery vehicle adoption.²²² Workhorse also suggests that state incentives for fleets to purchase electric trucks modeled after California's successful Hybrid and Zero Emission Truck and Bus Vouch Incentive Program would enable small business EV truck manufacturers to compete against the traditional large business ICE truck manufacturers for sales to fleets.²²³ As such, Workhorse points to the City of Chicago's voucher program and recommends that the ICC should explore ways to restore funding and consider expanding the program state-wide.²²⁴

C. Describe any other barriers to increased electrification of the transportation sector.

ABB states that standardization and interoperability are still major concerns for the EV charging landscape, especially for diverse needs of medium and heavy duty EVs.²²⁵ ABB explains that encouraging and supporting standards and related interoperability helps infrastructure to develop more efficiently and cost-effectively.²²⁶ The inevitable risk created by innovation can be manageable through the proving out of safety, reliability, and usability standards, according to ABB.²²⁷

Ameren indicates that additional barriers can vary. Lack of communication and public awareness of the benefits of EVs can be barriers, as can limited range and availability of charging infrastructure.²²⁸ Ameren claims that customers will desire an ability to maximize their use of the vehicle with shorter charging times and longer range between charges. Ameren contends that limited vehicle supply will likely be a barrier to increased electrification. Ameren notes that most EVs are small to midsized and

²²² Workhorse Initial Comments at 2.

²²³ Id.

²²⁴ Id.

²²⁵ ABB Initial Comments at 6.

²²⁶ Id.

²²⁷ Id.

²²⁸ Ameren Initial Comments at 9.

manufacturers may need to provide more variety to appeal to a broader range of consumers.²²⁹

AFPI indicates that there are no market barriers to deploy EV charging infrastructure in Illinois.²³⁰ AFPI explains that any customer seeking to install EV charging stations can contact suppliers of these services to complete the installation, just as HVAC contractors are hired to install air conditioning systems.²³¹

ComEd indicates that other barriers include:²³² limited number of public charging stations; lack of knowledge/awareness about EV benefits; limited EV models; the need to charge frequently (relative to ICE vehicles); limited range of EVs (relative to ICE vehicle refueling); and general lack of expertise and motivation by auto dealers to sell EVs.

CUB/EDF state that operational limitations (or perceived limitations, such as range anxiety), availability of public charge points and workplace charging, EV model availability, lack of equitable access to EVs, and reliance on fossil fuels if not managed properly, are all considered barriers to transportation electrification.²³³

The IMA believes there are currently no market barriers to the deployment of EV charging stations and they are being installed in hotels, gas stations, restaurants, retail stores, and in homes based on needs.²³⁴

Sierra Club and NRDC indicate that public awareness of consumer options and costs savings is crucial to EV expansion and utilities are ideally situated to provide the public and auto dealers with information.²³⁵

Tesla indicates that awareness and education are barriers for transportation electrification.²³⁶

²²⁹ Id.

²³⁰ AFPI Initial Comments at 2.

²³¹ Id.

²³² ComEd Initial Comments at 6.

²³³ CUB/EDF Initial Comments at 3.

²³⁴ IMA Initial Comments at 1.

²³⁵ Sierra Club and NRDC Initial Comments at 11.

²³⁶ Tesla Initial Comments at 8.

UCS states that one barrier to further EV deployment is the anxiety of passenger car and light truck drivers over public charging infrastructure coverage, especially for multi-unit dwelling residents and others without access to charging at home.²³⁷

The UCS states that another barrier is the incremental up-front cost of EVs and EV chargers, which applies especially to medium- and heavy-duty vehicle drivers and fleet operators.²³⁸

In Reply Comments, Greenlots states that to further illustrate the benefit of utility investment and engagement in growing and accelerating the market, and to help inform what action Illinois and its utilities should take, it is helpful to dive a bit deeper into the state of the current market for EVs and EV charging.²³⁹ Indeed, Greenlots claims that one of the most significant and enduring barriers to increased EV adoption is the lack of charging infrastructure, particularly public charging. Greenlots states that this is primarily on account of the fact that while there is competition between a relatively small field of sellers of EV charging products and services to motivated investors/site hosts, there is not a competitive market for offering these services directly to drivers. For example, in the residential context, an EV owner who needs a home charger will have no difficulty finding plenty of electric vehicle supply equipment sellers and EVSE offerings to install in his or her garage. The same goes for a business that is motivated to purchase, own and operate EVSE on their premises as a value-added service or amenity to their customers and/or employees, perhaps to increase employee satisfaction, bolster their social/environmental responsibility, attract customers or otherwise differentiate themselves in the marketplace. Greenlots states that unfortunately however, the existence of a competitive market largely ends here. Outside of these specific use cases there are many forms of public charging – chargers for which there are not motivated investors/buyers. This includes Level 2 chargers at public parking spaces or parking garages of certain multi-unit dwellings, or DC fast chargers in metro areas or key transportation corridors to facilitate everyday and longer-range travel. This is EVSE deployed purely to provide charging services –

²³⁷ UCS Initial Comments at 5.

²³⁸ UCS Initial Comments at 5.

²³⁹ Greenlots Reply Comments at 3.

chargers for provision of a charging service not in the context of offering an amenity or an additional value-added service. For this second critical category, Greenlots states that unfortunately a sustainable, competitive market is aspirational, and is unlikely to arise prior to the adoption of a critical mass of electric vehicles. According to Greenlots, this is primarily on account of a lack of a business model for the ownership and operation of public charging stations based on sustainable revenues from charging activities, and this has thus far resulted in a fundamentally inadequate amount of private investment in such charging infrastructure. Greenlots states that this is the specific category that drivers and studies consistently cite as being the primary barrier to EV adoption.

Tesla observes that several stakeholders' Initial Comments built on the overarching theme that access to charging infrastructure continues to be a primary barrier to scaling EV deployment in Illinois.²⁴⁰

a. Identify possible solutions to overcome those barriers.

ABB states that policy makers, stakeholders, and utilities need to mandate that any infrastructure funding opportunities require and specify open, interoperable standards for deployment investments.²⁴¹

Ameren asserts that potential solutions to the above-described barriers could include (1) a well-coordinated information and awareness campaign; (2) support for the development of a strong public charging infrastructure; (3) upstream incentives which may encourage more variety from EV manufacturers; (4) accessible user incentive programs; (5) tax credits, tax rebates and tax exemptions; and (6) development of ride share, car share, and other programs that allow access to EVs by underserved and disadvantaged communities.²⁴²

²⁴⁰ Tesla Reply Comments at 1.

²⁴¹ ABB Initial Comments at 6.

²⁴² Ameren Initial Comments at 10.

Ameren avers that to address low income and disadvantaged communities who are more likely to encounter stronger barriers, Illinois policy could take a number of approaches.²⁴³ Ameren maintains that because lower income customers may not have tax liability, a tax credit may not be as beneficial to them; therefore, the state could adopt a different or additional subsidy that these customers may be eligible to receive. Ameren states that policy could also encourage the development of 100% electric car-sharing programs that are available to members based on income. Also, Ameren suggests that Illinois could consider providing a vehicle financing option for the purchase of EVs that is made available to customers that are retiring older ICE vehicles or based on income. Finally, Ameren indicates that it is possible that the state could play a role in making used EVs more accessible through dealer incentives or customer incentives which could prove to be more affordable for customers with limited income.²⁴⁴

ComEd indicates that possible solutions to overcome barriers to increased electrification include:²⁴⁵ increased charging infrastructure deployment; education and awareness programs; incentives and rebates on vehicles and chargers; and legislative mandates that require auto manufacturers to sell a minimum number of EVs.

Sierra Club and NRDC posit that activities to maximize EV customer enrollment in EV rates include: website tools such as rate comparison calculators. (See Southern California Edison's SCE Electric Vehicle Rate Assistant Tool); dealership education and incentives; direct outreach to EV customers, help for utilities to identify which customers have purchased EVs through collaboration with the Department of Motor Vehicle registration records, so utilities can directly contact EV owners; price guarantees such as offering price guarantees the first six months or year after a customer signs up for a new rate to ensure customer does not pay more on the time-varying rate than they would on the standard rate. Thus, reducing customer's risk of signing up for a new rate structure.²⁴⁶

²⁴³ Ameren Initial Comments at 10.

²⁴⁴ Id.

²⁴⁵ ComEd Initial Comments at 6.

²⁴⁶ Sierra Club and NRDC Initial Comments at 11-12.

Tesla indicates that utilities can educate customers about EVs, where and how to charge, and about costs for using electricity relative to oil-consuming cars.²⁴⁷

UCS recommends on-bill financing by utilities for EVs and EV charging infrastructure.²⁴⁸ The UCS states that utilities already implement on-bill financing for energy efficiency investments, and they do not need to undertake the full scale of investment required to support substantial electrification.²⁴⁹ However, UCS states that on-bill financing could complement other funding sources and provide a long-term, sustainable way to address EV costs in order to reach a larger audience of vehicle owners and expand benefits to ratepayers.²⁵⁰

In Reply Comments responding to the Initial Comments of ATE and Sierra Club and NRDC, AFPI asserts the proper role of the Commission in the EV market and in the supply of electric vehicle equipment is not to assist and enable private companies to increase their market penetration, sales, and revenues.²⁵¹ AFPI states the Commission's regulatory powers have no role in transforming or intervening in the market with the explicit goal of adding a technology or product. The transformation of the transportation sector, and every sector, should be driven by consumer choice and market forces.²⁵²

AFPI notes that the AG and other commenters agree the EV market is still unsettled. AFPI points out that commenters provided very optimistic market projections for EVs, yet AFPI asserts that the reality is that these questions cannot be answered today without engaging in extensive speculation.²⁵³

AFPI argues that the cross-subsidization that would inevitably result from utilities owning and/or operating charging infrastructure is only intensified by the structure of incentives that would come as a result, where the risk-free decisions of guaranteed rate

²⁴⁷ Tesla Initial Comments at 8.

²⁴⁸ Union of Concerned Scientists Initial Comments at 5-6.

²⁴⁹ Id. at 6.

²⁵⁰ Id.

²⁵¹ AFPI Reply Comments at 1.

²⁵² Id. at 2.

²⁵³ Id.

of return of monopolies will inevitably result in suboptimal investment decisions, compared to those of private sector actors and is unjustifiable at the expense of the equal rights of the people of Illinois.²⁵⁴

AFPI notes that Illinois has low barriers to entry and regulatory certainty for market participants under the Illinois Public Utilities Act. The statute explicitly states providing electric service is not a “service” of a public utility.²⁵⁵ AFPI states that although the statute specifies a public utility is not precluded from providing electric vehicle charging service and is still considered a public utility under the Act, the preceding language makes clear that electric vehicle charging services is not an electric utility service; therefore, the Commission must require that any investment by a public utility in electric vehicle charging infrastructure must be done without using ratepayer funds.

Furthermore, AFPI cites Elevate Energy’s Initial comments: “(...) Illinois is currently the only state with hourly pricing programs available to all ratepayers. These programs (ComEd’s Hourly Pricing and Ameren Illinois Power Smart Pricing) empower EV owner to leverage off-peak charging to significantly decrease the overall cost of car ownership, and they create an emerging market space for aiding technologies.”²⁵⁶ Considering these facts, AFPI suggests that the Commission makes clear that the appropriate role for utilities in the nascent EV market is as “facilitator” where the utility treats EV charging like other potential load, providing nondiscriminatory electric service without engaging in vehicle charging business. In AFPI’s view, the facilitator framework protects equal rights of all consumers while leaving the door for innovation and competition open for future market participants.²⁵⁷

With respect to utilities providing education to consumers to promote EV ownership, AFPI strongly disagrees that utilities are appropriate actors to educate the public and automakers on consumer options and cost saving benefits of EVs to support EV expansion. AFPI finds that there is no valid reason to allow cost recovery for these types of expenses if utilities were to decide to engage in such activities. The notion that

²⁵⁴ AFPI Reply Comments at 2.

²⁵⁵ Id.

²⁵⁶ Id. at 2-3.

²⁵⁷ Id. at 3.

advertising expenses for the benefit of private entities should be recovered from customers is appalling, according to AFPI. Such practices are and should continue to be deemed under Illinois code, “promotional practices”. Under no circumstances should the Commission allow cost recovery for such expenses. AFPI states that if carmakers and EVSE providers find there is a lack of public awareness with regard to their products and services, it should not be incumbent on the ratepayers of Illinois to underwrite such expenses. AFPI strongly urges the Commission to unambiguously clarify this point in the interest of protecting ratepayers.²⁵⁸

In Reply Comments, Greenlots points out that the Commission faces critical decisions regarding how utilities can best utilize their resources, expertise and abilities to help overcome market barriers.²⁵⁹ Greenlots argues that a deeper role for a utility in growing EV adoption and the deployment of infrastructure is a strong positive for the market. Drivers benefit from more charging options, OEMs and retailers experience fewer barriers to sell EVs, EV charging software and hardware sellers benefit from competition provided by utility procurement or procurement facilitation, and everyone benefits from a more robust and cohesive market over time that maximizes benefits to the grid and ratepayers. Beyond the very clear opportunity to sell products and services through a competitive process to the utility, utility/ratepayer investment enables the market further by growing electric vehicle adoption and thereby scaling the market. It is only at a certain market scale where profitability for charging services outside of a utility program is more likely to be realized. Utility investment in EV charging infrastructure fundamentally enables electric vehicle service providers and grows the market – which results in a virtuous cycle for drivers and electric vehicle charging equipment and service providers, where more drivers improve the business case for charging such that more charging is deployed, which draws more drivers to adopt electric vehicles.

²⁵⁸ AFPI Reply Comments at 3.

²⁵⁹ Greenlots Reply Comments at 10.

Greenlots encourages the Commission to consider the virtues of deeper, flexible utility involvement in its analysis of the utility's relationship to other market participants and the market as a whole.²⁶⁰ Greenlots argues that adopting a modest policy or framework that affords utilities sufficient flexibility from which they can develop EV charging infrastructure plans would serve as a practical and useful first (or next) step. Going forward, Greenlots suggests that the Commission could encourage or require utilities to make annual filings to support transportation electrification. These could be components of, or separate from general rate proceedings. Greenlots encourages the Commission to afford Illinois utilities a deeper, flexible role to move with speed and scale in embracing their critical role in transportation electrification, and ensuring this transformation benefits all utility customers.²⁶¹

In Reply Comments, Tesla provides high level guidance for utility investments in transportation electrification for the Commission to consider:

- Initial utility programs can focus on charging infrastructure, rate design, and education and outreach but should not be overly complicated.
- Access to level 2 charging infrastructure for multifamily dwellings, workplaces and public locations is an important element of any initial utility program design to increase EV deployment.
- Any initial publicly-funded program design elements or qualifications, including interoperability and standards, should be evaluated in the context of various charging use cases (work, home, fleet etc.) and customer experience, costs and benefits without becoming too prescriptive.²⁶²

Tesla looks forward to collaborating further with the Commission and stakeholders to help drive EV adoption in Illinois.

UCS asserts that utilities and the Commission will play a role in transportation electrification and as stated in UCS's Initial Comments, utilities will provide an important function in the development of electric vehicle charging infrastructure.²⁶³ UCS notes, under the traditional model of utility investments, utilities already invest in many components of EV charging infrastructure from transformers to service connections and

²⁶⁰ Greenlots Reply Comments at 10.

²⁶¹ Id. at 11.

²⁶² Tesla Reply Comments at 6.

²⁶³ UCS Reply Comments at 2.

up to the customer meter. Furthermore, UCS argues that utilities are well positioned to contribute to investment in EV charging infrastructure because they possess the competencies, scale, access to debt and capital, and customer relationships to design and implement impactful transportation electrification programs. Siemens supports UCS statements by stating in its Initial Comments, utility involvement in EV charging infrastructure space is the key to realizing the “full value stack of EV benefits” for the electric grid, power supply costs, and integration of renewables generation.²⁶⁴

UCS notes that in the Initial Comments of the AG, AFPI, and API-IPC, they claim that the private sector is sufficiently active in the EV charging space that there is no need for utility intervention.²⁶⁵ These groups further argue that utility intervention would be detrimentally anti-competitive for charging stations. UCS recognizes that effects on competition should be a key consideration as utilities design programs and the Commissions considers proposals for such programs. UCS believes that EV initiatives should avoid creating “chilling effects” on private investment, as CUB/EDF have described. That said, UCS asserts that the economics of charging stations are generally not attractive to private investors at the present time. UCS points out that Sierra Club and NRDC and ABB note that demand charges are a key factor undermining the business case for high-power EV charging infrastructure in the near term while utilization is relatively low. Sierra Club and NRDC also note the “chicken and egg” dilemma that leads to market coordination problem leading to the under provision of charging stations and depressed adoption of EVs. As an early-stage investor in EV infrastructure, UCS believes that utilities can create a virtuous cycle of infrastructure investments that enable electric vehicle adoption that will eventually cultivate a competitive market for electric vehicle charging.²⁶⁶

UCS points out that in recognition of these facts in their own state, the California Public Utilities Commission (“CPUC”) has used a case-by-case balancing test for the effects of programs on competition.²⁶⁷ The results of these test have varied across service

²⁶⁴ Id.

²⁶⁵ Id. at 4.

²⁶⁶ UCS Reply Comments at 5.

²⁶⁷ Id.

territories, use cases, and customer classes to accommodate differing circumstances across these three dimensions. UCS encourages the Commission to adopt a similar approach to the CPUC when considering effects on competition in these early stages of transportation electrification. Such an approach, UCS argues, will allow utilities to implement programs in a variety of sectors using the ownership model(s) that best serve the ratepayers in their service territories. UCS expect the balancing test will naturally give different results over time as the market for electric vehicle charging matures.

UCS notes that the scale of investment required for substantial, beneficial transportation electrification is immense.²⁶⁸ Through 2050, the MJ Bradley & Associates Illinois analysis indicates a net present value of about \$400 million to nearly \$1.4 billion depending on the charging regime and EV penetration scenario. UCS states that utilities cannot and should not be responsible for all of these investments, though utilities will be key players in public charging while the economics remain a barrier and in the multi-unit dwelling space where incentives to invest are split on the customer side.

D. Should Illinois prioritize overcoming certain barriers over other barriers?

Ameren argues that Illinois should prioritize overcoming barriers that affect customers' ability to adopt EVs.²⁶⁹ Because cost will likely be a significant factor to customers, Ameren argues that any solutions that assist customers with lowering the cost of adoption of EVs should be prioritized. Next Ameren suggests that Illinois should prioritize efforts that will help customers overcome the general lack of awareness about the benefits of EVs. Ameren states that this is accomplished with education and awareness efforts. Finally, Ameren opines that Illinois should place some priority on adopting policy that will remove regulatory barriers that may inhibit utilities from assisting customers in adopting EVs.²⁷⁰

²⁶⁸ Id.

²⁶⁹ Ameren Initial Comments at 10.

²⁷⁰ Ameren Initial Comments at 10.

ATE urges the Commission to issue definitive policy guidance or direction for regulated utilities and all stakeholders, to follow in pursuing objectives. Also, the Commission should allow regulated utilities, multiple non-utility third parties, local government, vendors and potential host sites to put forward their own plans and priorities for accelerated deployment of EV infrastructure.²⁷¹

ATE states that for regulated utilities increasingly, good long-term planning on a five to 10 year basis to start has become vital to good planning and sound asset management. Prioritization of needs can take place within the context of distribution level planning efforts.²⁷² ATE recommends the utilities develop a “Pathway to 2030” type study focusing on decarbonization goals and accelerated EV adoption goals.²⁷³

ComEd believes that Illinois should prioritize overcoming certain barriers over other barriers.²⁷⁴

The Illinois Chamber of Commerce (“the Chamber”) states that the ICC should not drive policies that select one technology over another.²⁷⁵ The Chamber indicates that consumer demand will and should determine the success of any technology or product and the business community maintains that market forces will drive implementation of EVs.²⁷⁶ The Chamber further states that state incentives, like proposals to spread costs among Illinois ratepayers, whether they use EVs or not, could distort the market, misrepresent consumer choices, and hurt programs in the long run.²⁷⁷

As an example, the Chamber references mobile phone adoption, and how consumer demand and technological developments drove the market without governmental interference.²⁷⁸ While the Chamber agrees that the state has a

²⁷¹ ATE Initial Comments at 7.

²⁷² Id. at 7.

²⁷³ Id. at 7. See Pathway Studies of National Grid, Southern California Edison, the low-carbon pathway study by Southern Company.

²⁷⁴ ComEd Initial Comments at 6.

²⁷⁵ Illinois Chamber of Commerce Initial Comments at 1.

²⁷⁶ Illinois Chamber of Commerce Initial Comments at 1.

²⁷⁷ Id.

²⁷⁸ Id. at 2.

responsibility to ensure the continued safety, reliability, and efficiency of the electrical grid, the Chamber urges that this should be done in a technologically neutral context.²⁷⁹

The Chamber states that it supports the adoption of policies that focus on the impact to the consumers, drive growth, foster competition, and protect the environment but it emphasizes that it will take many different technologies and resources to reduce environmental impacts.²⁸⁰

The Chamber urges the Commission to seek policies that allow support technology adaptation and allow the private sector to develop, finance, build, and operate new energy and technologies of the future.²⁸¹

Dr. Santini states that Illinois, being in the “midcontinent” requires a different set of priorities for plug-in vehicle technology than coastal regions where weather extremes are much less severe and average driving distance per vehicle is less.²⁸² Santini continues to state that while long driving distances of customers in the midcontinent make fast intercity refueling more important, the cold temperature deficiencies regarding fast charging of all-electric vehicles creates cold climate marketability problems that appeared in sales data for the BMW i3 model.²⁸³

Dr. Santini recommends Illinois to encourage the deployment of plug-in hybrids, with a stipulation that the liquid fuel to be used by the internal combustion engines in longer-range versions of plug-in vehicles have a flex fuel capability to use either high-octane gasoline or high-level ethanol blend.²⁸⁴ Dr. Santini states that this would help avoid the shut down of ethanol production and sales capability development over decades.²⁸⁵

²⁷⁹ Id.

²⁸⁰ Id.

²⁸¹ Id. at 3.

²⁸² Santini Initial Comments at 1.

²⁸³ Santini Initial Comments at 1.

²⁸⁴ Id. at 2.

²⁸⁵ Id.

Dr. Santini also urges that California regulation should not be adopted as it pertains to EV range restrictions.²⁸⁶ Specifically, Dr. Santini notes that California regulations allow up to half of battery electric vehicles (“BEVs”) to be “range extended” vehicles with a fuel other than electricity, as long as the range on other fuel is no more than the all-electric range.²⁸⁷ Dr. Santini states that the California regulation should not be adopted in Illinois unless range extension systems for range extended battery EVs are allowed to be greater than the all-electric range.²⁸⁸ Dr. Santini states that this would reduce the need for daytime direct current fast charging, which would contribute to a lesser addition to peak demand by future battery EVs.²⁸⁹

According to Siemens, Illinois should prioritize lowering the TCO.²⁹⁰

Tesla argues that access to infrastructure is one of the primary barriers to transportation electrification and EV adoption, Illinois should focus on overcoming barriers that will help enable deployment like incentives for ready-made infrastructure and charging stations to help decrease the cost.²⁹¹

Benefits:

ATE refers to the LBNL essays and MJ Bradley study in 2017 to better understand benefits created by increased EV adoption in Illinois, regionally and nationally as well as the acceleration of EVSE deployments.²⁹²

ATE states that benefits include: Benefits of reduced greenhouse gas (“GHG”) emissions; disadvantaged neighbors and environmental justice; lower electric rates for

²⁸⁶ Id.

²⁸⁷ Id.

²⁸⁸ Id. at 2.

²⁸⁹ Id.

²⁹⁰ Siemens Initial Comments at 3.

²⁹¹ Tesla Initial Comments at 8.

²⁹² ATE Initial Comments at 8.

consumers; grid integration benefits; economic development benefits; and cost benefit methodologies

Siemens states that EVs offer important benefits to the electricity grid, power supply costs, and integration of renewable generation. EVs can act as non-wire alternatives to traditional grid reinforcement, provide peaking capacity and ancillary services, and lower costs by using wind and solar energy at times of abundance.²⁹³

A. Describe the cost benefits associated with increased EV deployment in Illinois.

Ameren states that there are three primary categories of benefits that result from EV technology when compared to existing ICE technology: environmental, economic, and consumer experience.²⁹⁴ EVs provide major benefits for the environment, for all customers, for the nation's energy grid, and for national security.

Ameren claims that EV charging that occurs when the energy grid has available capacity improves the efficiency of the energy grid - potentially lowering the average cost to serve all customers.²⁹⁵ Ameren states that EVs are powered by a nearly 100 percent domestic mix of energy sources - unlike gasoline-fueled vehicles, which depend solely on oil, only 40 percent of which is domestically produced.

ATE states that if smart charging programs and tariffs that encourage EV owners to move charging to off peak are properly implemented these programs should result in lower total revenue requirements for the utility, which should result in lower rates for all customers.²⁹⁶

ATE notes that a number of cost benefit methodologies have been used:

Ratepayer Impact Measure ("RIM") Test

Utility Cost Test ("UCT")

²⁹³ Siemens Initial Comments at 3.

²⁹⁴ Ameren Initial Comments at 11.

²⁹⁵ Id.

²⁹⁶ ATE Initial Comments at 9.

Total Resource Cost (“TRC”) test

Societal Cost Test (“SCT”)

Holistic Value Test

ATE recommends using the Holistic Value Test, EPRI commissioned a study from the Brattle Group to develop a middle ground approach of the TRC and SCT methodologies.²⁹⁷

ComEd states that if properly managed, EV charging could put downward pressure on per kWh rates. From a utility customer perspective, a greater demand for kWh, which if properly managed, could improve the utilization of installed distribution infrastructure.²⁹⁸ While EV owners will likely see an increase in kWh consumption and therefore correspondingly higher electric bills, they will likely pay less for energy and transportation costs as well as vehicle maintenance.²⁹⁹

Tesla notes that the Electric Vehicle Act of Illinois (20 ILCS 627) originally found “that the adoption and use of electric vehicles would benefit the State of Illinois by (i) improving the health and environmental quality of the residents of Illinois...”³⁰⁰ Tesla cites a study, depending on the number of EVs on the road, the benefits quantified are upwards of 12 – 42 billion dollars of savings. Benefits would accrue to all electric utility customers in Illinois due to greater utilization of the electric grid during off- peak hours, increased utility revenues from plug-in electric vehicles (“PEV”) charging, annual financial benefits to Illinois drivers owning PEVs and societal benefits from reduced gasoline consumption and associated GHG emissions. EVs make up only .12 percent of registered vehicles on the road in Illinois.

In his Reply Comments, Dr. Santini states that competition is fundamental to price stability and, subsequently, economic benefit.³⁰¹ Dr. Santini notes that electricity prices,

²⁹⁷ Id. at 10.

²⁹⁸ ComEd Initial Comments at 7.

²⁹⁹ Id.

³⁰⁰ Tesla Initial Comments at 9.

³⁰¹ Santini Reply Comments at 1.

like gas prices, vary significantly by location, season, and time of day.³⁰² Thus, rates should be based on estimates of long run costs, not short run marginal costs.³⁰³ Dr. Santini quotes Bonbright in stating that regulators should define long run marginal costs “only in general terms”³⁰⁴

a. What is the effect on the State?

ABB states that the reduced maintenance and fuel costs of government-owned EV fleets will save the tax-payer money.³⁰⁵

AEE states that EVs provide the opportunity for broad-based cost savings for ratepayers, expanded consumer choice amongst transportation options, enhanced economic competitiveness as countries around the world move towards electrifying transportation, improved security from reduced dependence on imports of conventional fuels, improved local air quality, and reduced greenhouse gas emissions.³⁰⁶

Ameren points out that the use of electricity to power vehicles can have significant energy security and emissions benefits.³⁰⁷ As Illinois adds more renewables to its mix of generation sources, such as solar and wind sources, emissions reductions will increase.

ATE states that the economic development benefits for Illinois and other Midwestern states are potentially significant and can be quantified in terms of state GDP, personal incomes, taxes generated, and other factors.³⁰⁸

The CACC states that at the end of 2017, about 15,200 plug-in electric vehicles were adopted in Illinois.³⁰⁹ The use of PEV here is inclusive to BEV and Plug-In Hybrid Electric Vehicles (“PHEV”). Cumulatively, CACC explains that through 2017, a total of 0.11 terawatt-hours of electricity have been consumed by PEVs in Illinois. CACC indicates that through 2017, PEVs have offset over 12 million gallons of gasoline in Illinois.

³⁰² Id.

³⁰³ Id.

³⁰⁴ Id. at 2.

³⁰⁵ ABB Initial Comments at 6.

³⁰⁶ AEE Initial Comments at 1.

³⁰⁷ Ameren Initial Comments at 11.

³⁰⁸ ATE Initial Comments at 9.

³⁰⁹ CACC Initial Comments at 2.

CACC notes that a BEV could potentially offset gasoline consumption by 5,470 gallons over the lifetime assuming 15% reduction in vehicle miles traveled comparing to a conventional vehicle. A PHEV with 40-miles range could potentially offset gasoline consumption by 3500 gallons of gasoline over the lifetime assuming 64% of vehicle miles traveled (“VMT”) is on electricity. CACC opines that increasing charging infrastructure would definitely increase the VMT on electricity for both BEV and PHEVs.

CACC states that the annual CO2 emissions are about 3,504 pounds per BEV and 5,509 pounds per PHEV in IL, which is lower than the national average due to cleaner electricity generation.³¹⁰ CACC suggests that the numbers are even lower than traditional per hybrid electric vehicle (“HEV”) which is about 6,250 pounds. CACC provides a complete snapshot of EVs in Illinois in Attachment A to CACC Initial Comments.

CACC quotes the Midcontinent Transportation Electrification Collaborative report, stating that “[n]umerous studies demonstrate that EV adoption at scale, under the right circumstances, can offer benefit for utility customers.”³¹¹ CACC states that several studies from MJ Bradley project that the additional utility revenues from EV charging will likely exceed the cost to supply that demand. This translates, CACC states, to a downward pressure on utility rates and benefits for all utility customers (whether or not they themselves purchase an EV). CACC points out that a recent study conducted in Illinois considered the impacts of a “moderate” and “high” adoption scenario for EVs in the state, with EVs reaching either 18 percent or 56 percent of light duty vehicles in 2050. CACC indicates that in both scenarios, the net present value (benefit minus cost) of benefits to utility customers, Illinois drivers, and society at large would total \$12.2 billion (moderate) or \$43 billion (high).

³¹⁰ Id.

³¹¹ CACC Initial Comments at 3.

ComEd believes that electric vehicles have the potential to provide beneficial electrification to Illinois, by lowering emissions, increasing economic opportunity, improving utilization, and potentially putting downward pressure on electric rates.³¹²

ComEd states that due to a lower amount of gasoline sales and consumption, EV deployment may have an impact on gas tax proceeds. Increased deployment of EVs will also reduce GHG emissions. Additionally, EV deployment will result in more domestic (versus foreign) sourced fuel used for transportation.³¹³

Elevate Energy states that EV market development will present a major opportunity for Illinois businesses and communities by increasing innovation and economic development.³¹⁴

Sierra Club and NRDC indicate that integrated EV charging can lower electric rates for all utility customers by capturing additional utility revenues without commensurate increases in utility costs. The incremental load of electric transportation leads to greater electricity system asset utilization and lowers the average cost of electricity service—particularly if majority of load occurs at off-peak times.³¹⁵

b. What is the effect on individual EV owners?

AEE states that EVs provide drivers with substantial performance improvements over conventional vehicles. The improvements range from the financial – lower fuel and maintenance costs mean that the total cost of ownership for an electric vehicle is often lower than that of a comparable conventional vehicle – to the driving experience – EVs offer instant torque allowing the vehicles to accelerate faster.³¹⁶

Ameren states that Consumer Reports® lists the owner satisfaction for new EVs as very high.³¹⁷ In fact, Ameren states that for all 14 EVs listed as available today, seven rate “excellent,” four rate “above average,” two rate “average,” and only one rates “below

³¹² ComEd Initial Comments at 1.

³¹³ Id. at 7.

³¹⁴ Elevate Energy Initial Comments at 1.

³¹⁵ Sierra Club and NRDC Initial Comments at 12.

³¹⁶ AEE Initial Comments at 1-2.

³¹⁷ Ameren Initial Comments at 11.

average.” Ameren believes that consumers testing EVs quickly realize that electric drives are simply a better way to move a car. Ameren states that electric drives offer 100% torque from a stop, so they are very quick in response, and quite powerful, offering impressive 0-60 mph statistics. For example, the Chevy Bolt EV boasts 200 horsepower and can deliver 0-60 mph in 6.8 seconds. Ameren states that electric vehicle owners also appreciate the quiet and smooth acceleration EVs provide, without the traditional rumble, vibration, and shifting of an engine and associated transmission. Ameren also notes that in this age of electronics and mobile devices, EVs typically have an associated mobile application (app) that allows the owner to view logged energy use, miles driven, and fuel efficiency data on a computer or smartphone. The apps also allow a user to start or stop battery charging remotely, and this capability may someday support a cost-effective utility-sponsored demand response program.³¹⁸

Ameren notes that EVs are typically cheaper to operate than gasoline vehicles, due to lower fuel and maintenance costs.³¹⁹ Ameren states that as battery costs fall, the EV price premium over conventional combustion engine vehicles will decline. Already today, Ameren suggests that the low price of EVs on the secondary market makes them an affordable driving option. Ameren argues that electric utility investment can make charging infrastructure more affordable for customers to install, and time varying rates can benefit customers and the energy grid. Moreover, Ameren claims that EV charging that occurs when the energy grid has available capacity improves the efficiency of the energy grid - potentially lowering the average cost to serve all customers.³²⁰

Ameren claims that due to their simplicity, EVs have many fewer parts that require maintenance and/or that can fail and, as a result, have lower maintenance costs.³²¹ As an example, Ameren notes that General Motors states that the first major maintenance interval for its 2017 Chevy Bolt EV, an all-electric vehicle with 238 miles of range, is 150,000 miles. Ameren suggests to imagine no oil changes, transmission fluid, spark plugs, timing belts, or other typical combustion-engine maintenance items for ten years.

³¹⁸ Ameren Initial Comments at 12.

³¹⁹ Id.

³²⁰ Id.

³²¹ Id.

Ameren suggests that EVs are also less expensive to fuel than an ICE vehicle. Assuming a retail rate of 12.5¢ per kilowatt-hour (“kWh”), fueling a vehicle is approximately equivalent to paying \$1/gallon for gasoline. Ameren states that marginal prices, or prices for the next kWh consumed are often well below 12.5¢/kWh. Moreover, prices vary with the time of year.³²² For example, Ameren’s summer all-in prices for residential customers taking fixed-price power supply from Ameren are about 10.5¢/kWh. About 9¢/kWh for the first 800 kWh of non-summer use, and about 7¢/kWh for non-summer use over 800 kWh.

AFPI cited the Pacific Research Institute, which states that seventy-nine percent of electric vehicle plug-in tax credits were claimed by households with adjusted gross incomes of over \$100,000 per year.³²³ AFPI also states that nearly 679,000 households in Illinois are experiencing unaffordable energy burdens of between 19 and 36 percent of their annual income.³²⁴ AFPI further states that the ICC should look for ways to reduce electricity costs for utility customers instead of intervening in the existing competitive market for EV charging stations.³²⁵ AFPI concludes that intervention by the ICC could lead to barriers for current and future non-utility participants to enter the existing, competitive EV charging infrastructure market.³²⁶

API-IPC states that this NOI suggests that EVs have high upfront costs but low maintenance costs.³²⁷ API-IPC explains that this approach does not recognize the total cost of ownership of the vehicle.³²⁸ API-IPC cites two studies that indicate the cost of ownership of a battery electric vehicle representative of current technology is between

³²² Id.

³²³ AFPI Initial Comments at 3.

³²⁴ Id.

³²⁵ Id.

³²⁶ Id.

³²⁷ API-IPC Revised Initial Comments at 4.

³²⁸ Id.

fifty percent and four-hundred percent more expensive than a conventional vehicle equipped with an internal combustion engine.³²⁹

ATE states that EV owners could enjoy lower fuel costs and lower costs of operation.³³⁰

ComEd states that while EV owners may likely realize a larger electric bill due to increased consumption, they will pay less for energy and transportation costs and vehicle maintenance overall. Charging off-peak would also provide EV owners with the opportunity to pay a lower rate per kWh through rate options, such as hourly pricing.³³¹

Elevate Energy states that EV market development will reduce fuel costs for consumers, especially when optimizing off-peak charging rates to lower the overall cost of EV ownership.³³²

Sierra Club and NRDC indicate that electricity is a significantly cheaper fuel than gasoline: according to the Department of Energy's eGallon calculator, the current statewide average gasoline price is \$2.79, while the eGallon equivalent electricity price is \$1.07.³³³

Tesla indicates that as more EVs are deployed, the costs of EVs can significantly decrease which is primarily driven by the cost of batteries.³³⁴

In referencing its report, "Going from Pump to Plug" (Appendix C), UCS states that EV drivers can save \$912 per year in fuel costs on the standard residential electricity rate, compared to driving a gasoline or diesel vehicle.³³⁵ The UCS notes that electricity prices are more stable than gasoline prices, so EV drivers are also insulated from gasoline and diesel price spikes.³³⁶

³²⁹ Id.

³³⁰ ATE Initial Comments at 9.

³³¹ ComEd Initial Comments at 7.

³³² Elevate Energy Initial Comments at 1.

³³³ Sierra Club and NRDC Initial Comments at 13.

³³⁴ Tesla Initial Comments at 9.

³³⁵ Union of Concerned Scientists Initial Comments at 2.

³³⁶ Id.

The UCS also references a report by MJ Bradley & Associates, “Electric Vehicle Cost-Benefit Analysis: Illinois.” This report quantifies the net benefits for utility customers and EV drivers attributable to EV adoption for two scenarios.³³⁷ The first scenario, MISO – McKinsey, shows 18% EV penetration by 2050; the second scenario, Bloomberg New Energy Finances, shows 56% penetration by 2050.³³⁸

In response to AFPI and API-IPC, ChargePoint states that their assertion that EVs would burden low-income utility customers and only benefit affluent customers is flawed, as it is based on a cost-benefit analysis that ignores all the “benefits”.³³⁹ ChargePoint cites to several EV NOI Initial Comments where participants indicate the benefits of electrification when appropriately integrated into the grid.³⁴⁰

In their Reply Comments, Sierra Club and NRDC note EVs will become more and more affordable and accessible, as leasing companies sell their EVs to the secondary market, and electric car sharing pilot programs increasingly target low-income communities.³⁴¹

UCS states that in response to the Commission’s question on the cost/benefit effects on individual EV owners, API-IPC claims that the cost of owning an EV is substantially more expensive than an internal combustion engine vehicle, citing in part a study by Arthur D. Little (“ADL”).³⁴² UCS has written about the difference between the ADL study and the UCS report, *Cleaner Cars from Cradle-to-Grave*. In brief, UCS states that the ADL study makes two assumptions about EVs that undermine a comparison of EVs and combustion engine vehicles on consistent terms.

UCS states that the first assumption is that the battery of each EV will need to be replaced after the manufacturer warranty expires at seven to ten years after purchase.³⁴³

³³⁷ Id.

³³⁸ UCS Initial Comments at 2.

³³⁹ ChargePoint Reply Comments at 2.

³⁴⁰ Id.

³⁴¹ Sierra Club and NRDC Reply Comments at 7.

³⁴² UCS Reply Comments at 5.

³⁴³ Id.

UCS argues that there is no evidence that this is the case for battery lifetime. If combustion engine cars required replacement of major parts after the warranty expired, they would get a new engine or transmission after five years. By including a replacement battery in the accounting for EVs, UCS argues that the ADL study erroneously inflates the cost of EVs.

UCS states that the second unrealistic assumption in the ADL study is that EV drivers will require an alternative, gasoline car for a quarter of all miles driven because EVs are driven fewer miles per year than gasoline cars.³⁴⁴ In reality, UCS asserts, it is unlikely that EV buyers would purchase a car that covers only 75 percent of their trips. UCS states that EV drivers likely demand fewer miles of their vehicles and are, therefore, not subject to the cost of an alternative gasoline vehicle for some trips. In addition to inflating the lifetime cost of an EV by \$10,000 (15%), these assumptions reduce the estimated greenhouse gas benefit of EVs. In actuality, UCS observes that battery cost for EVs are rapidly improving and the upfront cost of EVs are expected to fall accordingly. Already, the fueling and maintenance costs for EVs are lower than gasoline vehicles, as UCS discussed in Initial Comments.

B. Describe the environmental benefits associated with increased EV deployment in Illinois.

ABB states that transportation electrification reduces air and noise pollution, especially in densely populated areas and disadvantaged communities that tend to be in heavier transportation corridors.³⁴⁵

CUB/EDF argue that electric vehicles offer enormous potential for GHG emissions reductions.³⁴⁶ CUB/EDF also states that electrifying personal commutes, ground shipping, deliveries, and fleets will improve local air quality and reduce climate-warming

³⁴⁴ UCS Reply Comments at 6.

³⁴⁵ ABB Initial Comments at 7.

³⁴⁶ CUB/EDF Initial Comments at 3.

emissions, particularly if designed to take advantage of the availability of clean resources and to shave peaks served by the most expensive, polluting generators.³⁴⁷

CUB/EDF further argue that emissions reductions stemming from increased EV deployment will count toward any broader emissions reduction targets or requirements in place at the time, reducing the need to invest in reducing emissions from other sources that potentially would be costlier to address than increasing EV deployment is. This substitution effect is especially clear with greenhouse gas emissions because the climate impacts of these emissions depend solely on volume, regardless of the nature or location of the source.³⁴⁸

Elevate Energy states that EV market development will reduce harmful carbon emissions.³⁴⁹

The MMC argues that a transition to zero emission EVs will realize substantial health and climate related savings for the region and protect the health of vulnerable residents. These benefits will be realized by combining a growth in clean electrical power with the expansion of transportation electrification.³⁵⁰

MMC believes that The United States' dependence on oil for our transportation needs adds significant risk to the stability our economy and weakens our national security. Electrifying our transportation can lead us towards energy independence and a more stable economy, while creating jobs and reducing harmful emissions. The MMC states it is eager to facilitate the adoption of EVs as a clean, sustainable transportation energy solution that addresses air pollution and climate change.³⁵¹

Sierra Club and NRDC indicate that widespread transportation electrification, EVs will reduce cumulative greenhouse gas emissions by 97 million metric tons. EV produces zero criteria pollutant emissions at tailpipe reducing mobile source pollution that

³⁴⁷ CUB/EDF Initial Comments at 3.

³⁴⁸ Id. at 4.

³⁴⁹ Elevate Energy Initial Comments at 1.

³⁵⁰ MMC Initial Comments at 2.

³⁵¹ Id. at 3.

contributes to unhealthy air and health risks, particularly in disadvantaged communities. EVs are the only vehicles on the road that get cleaner with age: as Illinois' grid shifts toward higher penetrations of renewable and other-low-carbon generation resources, EVs' emission profile will continue to decline.³⁵²

Tesla indicates that EVs emit 70 percent less GHG emissions than their counterparts in Illinois.³⁵³ Beyond environmental benefits, there are health and air quality benefits from EVs.

In referencing its article, "Delivering Opportunity," the UCS states that significant reductions in greenhouse gas emissions can be achieved in Illinois by electrifying heavy-duty vehicles, such as buses.³⁵⁴

The UCS also states that greenhouse gas performance per mile driven of EVs in the vehicle fleet will continue to improve as grid emission factors improve through the incorporation of renewables and other low carbon electricity fuels onto the grid.³⁵⁵ The UCS urges that fleet electrification is important because cars spend over 11 years in the fleet, and buses spend over 8 years in the fleet on average.³⁵⁶

Workhorse states that all-electric delivery vehicles can replace diesel delivery vehicles and achieve one hundred percent NOx reduction, eliminate particulate matter emissions, and eliminate greenhouse gas emissions from tailpipes.³⁵⁷ Specifically, diesel delivery vehicles usually operate in areas with a disproportionate pollution burden, as many distribution centers are in locations that now receive a disproportionate share of air pollution burden from diesel fleets.³⁵⁸ Workhorse thus states that allocating funding for

³⁵² Sierra Club and NRDC Initial Comments at 14.

³⁵³ Tesla Initial Comments at 9.

³⁵⁴ UCS Initial Comments at 4.

³⁵⁵ Id.

³⁵⁶ Id.

³⁵⁷ Workhorse Initial Comments at 1.

³⁵⁸ Id.

electric delivery vehicle purchases would be the quickest and most effective way to mitigate damage from diesel emissions to human health and the environment.³⁵⁹

UCS states that API-IPC and AFPI call into question the greenhouse gas reduction benefits of electric vehicles.³⁶⁰ API-IPC focuses on the emissions from manufacturing batteries, citing a study from the IVL Swedish Environmental Research Institute (“IVL”). UCS states that the IVL study makes several assumptions about the greenhouse gas intensity of the electricity grid on which the batteries are produced. In the Global Warming Policy Forum article on the IVL study (cited by API-IPC in their Revised Initial Comments), the IVL study authors discuss average energy and greenhouse gas intensity of batteries of a given size from the literature. UCS asserts that the IVL study and the article do not account for the production chains of specific vehicles. UCS notes that the way in which API-IPC uses the study confuses the study findings on average intensity for actual greenhouse gas intensity of EV battery manufacturing. For example, API-IPC notes from the article that a combustion engine would need to be driven up to eight years before it emits the same amount of greenhouse gases as a large battery EV. Presumably, UCS notes that this figure comes from the IVL study author saying that a gas car would need to be driven that long “before it has released as much carbon dioxide” as a “battery of Tesla size”. In reality, UCS argues that Tesla batteries are manufactured with on-site solar, wind, and geo-thermal power at the company’s Nevada’s Gigafactory, and therefore, the manufacturing of these batteries are much less greenhouse gas intensive than suggested by API-IPC.

UCS states that AFPI claims “EVs in Illinois often do not yield any net emission reductions” and any realized emissions reductions come at great cost.³⁶¹ UCS observes that AFPI does not provide a source to examine, so UCS simply reiterates that UCS has found substantial greenhouse gas benefits of EVs, as described in Initial Comments and elaborated in reports attached to UCS Reply Comments, “Cleaner Cars from Cradle to Grave” and “Delivering Opportunity.”

³⁵⁹ Id.

³⁶⁰ UCS Reply Comments at 7.

³⁶¹ Id. at 8.

- a. Compare environmental benefits to the environmental detriment if additional EV and charging infrastructure is not developed and deployed.

ATE states that today, Illinois ranks fifth in the nation in annual emissions of carbon dioxide- about 219 million tons of CO₂. About 71 million tons can be attributed to the transportation sector. The more rapid adoption of EVs should play a significant role in reducing such emissions.³⁶²

ComEd cites a study conducted by MJ Bradley & Associates which concludes that, absent large scale EV adoption, baseline annual fleet emissions are projected to fall to 32M tons by 2050 from a current level of 53M tons (a 53% reduction). This is based on expected improvements in conventional vehicle efficiency. In an aggressive scenario, wide scale adoption of EVs could reduce this baseline by an additional 7.7M tons to 24.3M tons (a 64% reduction from current levels). Through 2050, there could be a cumulative GHG reduction of 97 million metric tons if EVs are aggressively adopted in Illinois. Bradley equates the monetized social value of these reductions to \$441M/year by 2050, which includes improvements in quality of life and reductions in medical costs.³⁶³

The UCS states that local air pollution from vehicle tailpipe emissions have serious health impacts.³⁶⁴ The UCS states that since EVs do not have tailpipe emissions, transportation electrification can reduce local air pollutants and their consequential health impacts.³⁶⁵ Specifically, UCS points out that heavy-duty vehicles emit a disproportionate amount of fine particulate matter and nitrogen oxide, which disproportionately affect low income and minority communities.³⁶⁶

³⁶² ATE Initial Comments at 9.

³⁶³ ComEd Initial Comments at 7.

³⁶⁴ UCS Initial Comments at 4.

³⁶⁵ UCS Initial Comments at 4.

³⁶⁶ Id.

b. Describe the environmental effect of EVs on the environment over the lifespan of an EV.

Ameren opines that EVs substantially reduce emissions, and this is true even when considering the source of the electricity that energizes the grid.³⁶⁷ Based on the average-electricity-generation mix nationwide, Ameren states that EVs emit less than half the greenhouse gas emissions of conventional vehicles and significantly reduce particulate emissions. Ameren suggests that the carbon and air quality benefits will grow as electricity generation continues to get even cleaner through increasing deployment of renewables. EVs convert about 59% - 62% of the electrical energy from the grid to power at the wheels. Conventional gasoline vehicles only convert about 17% - 21% of the energy stored in gasoline to power at the wheels.

Ameren notes that Illinois' fuel mix has a variety of sources with coal being the largest contributor.³⁶⁸ However, Ameren notes that even considering this largely fossil-based source fuel mix, EVs are so efficient and utility generation emissions controls are so effective that EVs still produce almost 50% less NOx, a precursor to ground level ozone or smog, and less CO2 than comparable combustion engine vehicles.

Ameren claims that beyond the fact that overall emissions are lower, EVs produce zero emissions at ground level close to where people live.³⁶⁹ Additionally, Ameren states that EVs require fewer fluids than traditional counterparts do and, therefore, pose less risk of leaks or spills of petroleum and other automotive chemicals that contaminate roadways and, ultimately, pollute soil and waterways. This reduction or elimination of the possibility of leaks or spills is true during fueling, operation, or even when parked.

Ameren suggests that a smaller but not insignificant environmental benefit of EVs is that they produce less noise pollution.³⁷⁰

³⁶⁷ Ameren Initial Comments at 13.

³⁶⁸ Id.

³⁶⁹ Id.

³⁷⁰ Ameren Initial Comments at 14.

Ameren argues that essentially, the substantial and widespread benefits of a shift to EVs are simply much less likely to occur without the development of EV charging infrastructure.³⁷¹ Ameren argues that a concerted effort to develop infrastructure would likely have the effect of accelerating consumer adoption of EVs and capture the associated environmental benefits sooner and at larger scale.

API-IPC states that EVs will have a significant environmental affect.³⁷² The API-IPC states that electric vehicles considered “zero emission vehicles” are better described as “emissions displacement” vehicles.³⁷³ API-IPC references the DOE/EPA website, which demonstrates that CO2 emitted when generating and providing electricity to a battery electric vehicle is equivalent to 20-66 percent of that from a gasoline-fueled vehicle.³⁷⁴ API-IPC also points out that the emissions do not count the energy required to build the vehicle and battery systems, especially if the battery is built in China or Germany, where coal is the primary fuel source for electricity generation.³⁷⁵

Regarding the disposal of batteries, API-IPC cites an article, which indicates that less than 3% of lithium-ion batteries in the world are recycled.³⁷⁶ Thus, there will be a concern of what happens to all the other batteries if EV deployment increases.

ATE states that as zero and low carbon resources become more cost-effective such as solar and wind, and as the public policy support for zero carbon nuclear generation is continued, the power generation mix will move toward a lower emission path and complement the environmental progress that will be made in the transportation sector.³⁷⁷

ComEd states that the annual CO2 emissions for a BEV are approximately 1.4 metric tons, as compared to an ICE vehicle’s annual CO2 emissions of approximately 3.9

³⁷¹ Id.

³⁷² API-IPC Revised Initial Comments at 3.

³⁷³ Id. at 4.

³⁷⁴ Id.

³⁷⁵ Id.

³⁷⁶ Id.

³⁷⁷ ATE Initial Comments at 8.

metric tons. Thus, over the lifespan of a BEV (approximately 15 years) there would be a net reduction of about 40 metric tons of carbon emitted into the atmosphere per vehicle.³⁷⁸

Tesla and UCS both refer to UCS' report, "Cleaner Cars from Cradle to Grave," which indicates that on average, over its lifetime, an EV will produce less than half of the global warming emissions of comparable gasoline powered vehicles, even when taking into account the higher emissions associated with EV manufacturing.³⁷⁹

C. Describe any other benefits associated with increased EV deployment.

The AEE included their September 2018 report, "EVs 101: A Regulatory Plan for American's Electric Transportation Future," to supplement their Initial Comments in support of transportation electrification.³⁸⁰

The AG states that the Commission should note that in Illinois, as of December 31, 2017, electric vehicles and electric plug-in hybrid vehicles each represented only 0.07% of registered vehicles (7,692 and 7,856 respectively out of 10,979,102 registrations).³⁸¹ The AG further states that Illinois is consistent with national trends, where electric-only vehicles and plug-in hybrid EVs each represented less than 1% of the nation's total vehicle sales in 2017.

The AG states that there are many different types of electric vehicles, as the Notice of Inquiry notes. In the mass market, there are fully electric cars and electric hybrids which supplement mileage with gas. The AG states that the fully electric cars can have ranges from 100 miles to 400 miles on a full charge, and hybrid plug-in electric cars have ranges of 20-50 miles, depending on make and model and driving conditions. The AG indicates that today plug-in hybrids are more widespread and less costly than all-electric cars. In designing policy, the AG submits that the Commission must recognize that the EV market

³⁷⁸ ComEd Initial Comments at 8.

³⁷⁹ Tesla Initial Comments at 10; UCS Initial Comments at 3.

³⁸⁰ AEE Initial Comments at 3.

³⁸¹ AG Initial Comments at 1.

is still unsettled. Clearly, the AG asserts that a car that requires an electric charge for 400 miles will present a different challenge than a car that needs to charge for only 40 miles.³⁸²

Ameren submits that there are three primary categories of benefits that result from EV technology when compared to existing ICE technology: environmental, economic, and consumer experience.³⁸³ Ameren states that increased deployment quite possibly could result in positive health benefits and reductions in medical costs related to decreased air pollution and toxic emissions. Ameren also notes that there are potential climate impacts due to reduced greenhouse gas emissions and a reduction in the dependence on petroleum-based fuels. Finally, Ameren states that greater customer choice in the transportation sector (both on- and off-road) will result.

AFPI states that investments in EVs cannot be justified based on any reduction in carbon dioxide emissions.³⁸⁴ Specifically, AFPI states that the federal government's current estimate of the value of avoiding carbon emissions is \$1-6/ton in 2020.³⁸⁵ AFPI states that earlier estimates from previous administrations never placed a value higher than \$42/ton in 2020.³⁸⁶

AFPI points out that in Illinois, EVs do not yield any net emission reductions, and if they do, it is at the cost of many thousands of dollars per ton.³⁸⁷ AFPI explains that this is because: Electricity is mainly supplied by coal and natural gas; EVs are often charged during peak demand times when simple cycle gas combustion turbines must meet load; more than 15% of electricity is lost during the transmission, distribution, and charging process; and EV charging infrastructure and associated transformer upgrades are extremely expensive.³⁸⁸

³⁸² Id. at 2.

³⁸³ Ameren Initial Comments at 14.

³⁸⁴ AFPI Initial Comments at 2.

³⁸⁵ AFPI Initial Comments at 2.

³⁸⁶ Id.

³⁸⁷ Id.

³⁸⁸ Id.

ATE states that as more EVSE is deployed at the edge of the grid, it should enable more technologies, such as demand response (“DR”) and potentially distributed storage to be more easily integrated into the distribution grid of the future. EVs and EV infrastructure will constitute a key building block for distributed architecture and infrastructure of the future.³⁸⁹

CACC notes that from a manufacturing point of view, most electric vehicles sold in the United States are assembled in the United States.³⁹⁰ To date, CACC states that over four-fifths of BEVs and nearly two-thirds of PHEVs have been assembled in the United States. CACC indicates that most of the remaining PEVs sold in the United States were assembled in Germany or Japan. CACC points out that according to the U.S. Department of Energy “2017 U.S. Energy and Employment Report (“USEER”),” 258,000 U.S. manufacturing jobs were associated with electrification.³⁹¹

ComEd believes that transitioning to EVs provides a great opportunity for the U.S. to achieve energy independence by replacing the consumption of foreign sourced petroleum with domestic energy sources. Electric vehicles reduce noise pollution, creating a more comfortable environment for society, providing opportunities for increased productivity, and improving employee safety.³⁹²

ComEd believes that electric vehicles have the potential to provide beneficial electrification to Illinois, by lowering emissions, increasing economic opportunity, improving utilization, and potentially putting downward pressure on electric rates.³⁹³

CUB/EDF argues that the flexible charging load can help support the cost-effective integration of distributed energy resources as well as potentially serving load directly. Proper planning, coordination, and incentives, effective management of Illinois’ fuel mix

³⁸⁹ ATE Initial Comments at 9.

³⁹⁰ CACC Initial Comments at 2.

³⁹¹ Id. at 3.

³⁹² ComEd Initial Comments at 8.

³⁹³ Id. at 1.

and charging load can help cost effectively manage serving additional EV charging load.³⁹⁴

Elevate Energy notes that Illinois is uniquely situated to maximize economic and environmental benefits and become a national EV market leader.³⁹⁵ Elevate Energy states that Illinois is currently the only state with hourly electricity pricing programs available to all ratepayers.³⁹⁶

First, Elevate Energy refers to Ameren Illinois Power Smart Pricing. This program offers hourly rates based on the actual market price for residential electricity customers in Ameren Illinois territory.³⁹⁷ Participants can manage their electricity costs by taking simple actions to conserve energy during hours when prices are higher.³⁹⁸ This program has reduced over 10 million kWh in energy use, which avoided over 15.7 million points in greenhouse gas emissions, and saved participants more than \$11 million.³⁹⁹

Next, Elevate Energy discusses ComEd's Hourly Pricing Program, which charges residential participants in ComEd territory the hourly wholesale market price for electricity.⁴⁰⁰ This program has reduced over 48 million kWh in energy use, which avoided over 42,569 metric tons in greenhouse gas emissions, and saved participants more than \$19 million since the program began in 2007.⁴⁰¹

Tesla indicates that there are direct ratepayer benefits in the form of downward pressure on rates due to higher utility revenues associated with increasing electricity sales. Increasing the utilization of fixed costs, during off-peak periods, reduces the per unit costs of fixed assets. RMI summarized ratepayer benefits of EVs and found a range of \$744 to \$9607 of total lifetime benefits per EV.⁴⁰²

³⁹⁴ CUB/EDF Initial Comments at 4.

³⁹⁵ Elevate Energy Initial Comments at 1.

³⁹⁶ Id. at 1-2

³⁹⁷ Id. at 2.

³⁹⁸ Id.

³⁹⁹ Elevate Energy Initial Comments at 3.

⁴⁰⁰ Id. at 2.

⁴⁰¹ Id. at 3.

⁴⁰² Tesla Initial Comments at 10.

In Reply Comments, Greenlots observes that transportation electrification stands to bring a host of benefits to Illinois and society at large, as many stakeholders recognized in their Initial Comments.⁴⁰³ According to Greenlots, these include economic development and cost savings, as well as environmental and energy security benefits, among others. Additionally, Greenlots contends that transportation electrification represents likely the single greatest opportunity to increase the utilization and efficiency of the electric grid to the benefit of all ratepayers. Greenlots says that these benefits will not happen automatically however, and will require thoughtful and deliberate planning and programs to realize.

Greenlots observes that several initial comments asserted that transportation electrification only benefits rich people who drive EVs.⁴⁰⁴ To dispel this, Greenlots argues that one only needs to look at the electric vehicle cost-benefit analysis specific to Illinois that was performed by MJ Bradley & Associates. This report, cited by many stakeholders in their Initial Comments, clearly lays out and places values on two other key categories of benefits other than those that directly accrue to drivers, namely utility customer savings and societal value from CO2 reductions. Greenlots notes that many other reports and studies lay out the significant array and categories of benefits from transportation electrification also. Greenlots opines that it is important to note that there are many other benefits also that are not accounted for in this report, including those related to energy independence, energy security, and economic development derived from increased transportation electrification. Greenlots states that unfortunately these comments also fail to recognize that it is generally lower income communities suffering disproportionately from the environmental and human health effects of fossil fuel emissions from transportation, and therefore that lower income communities have the most to gain from electrification. Additionally, Greenlots notes that state and especially utility involvement can further enhance and ensure equitable access to electric transportation.

⁴⁰³ Greenlots Reply Comments at 1.

⁴⁰⁴ Id. at 2.

Greenlots states that while EVs currently are more expensive up front than their fossil fuel counterparts, this will not be the case for long, and there already are some exceptions to this in the second-hand market, and already many EV drivers have experienced a lower total cost of ownership versus fossil fuel vehicles.⁴⁰⁵ Greenlots notes that Bloomberg New Energy Finance estimates that by 2024 certain new EVs will reach cost parity with their fossil fuel counterparts, and Greenlots expects a more aggressive timeframe. To prepare for this, and to maximize the societal benefits and those that accrue to all utility customers, Greenlots states that Illinois cannot afford inaction.

In Reply Comments, IER states that several of the submissions have cited a September 2017 study conducted by MJ Bradley & Associates, which reports large net benefits to the state under two different scenarios of EV penetration.⁴⁰⁶ IER indicates that the ICC's Notice of Inquiry does not pertain to a specific proposed rule, and thus IER comments should not be construed as an endorsement or critique of any particular policy for the state. Nonetheless, IER states that the estimates of the alleged "net benefits" of EV penetration in the MJ Bradley study are at various times misleading and flawed, and Illinois officials should be aware of the potential problems when considering EV policy options.

IER claims that roughly 90 percent of the reported net benefits from EV penetration is due to a reduction in operating costs for Illinois drivers—in other words, that it will be cheaper for them to recharge their EVs rather than buy gasoline for conventional vehicles. IER contends that such calculations are quite speculative and rely on many assumptions, including (for example) the initial purchase price of the respective vehicles, the pattern of charging (such as time of day) for EVs, as well as prices for gasoline and electricity over the lifetime of a vehicle.⁴⁰⁷

⁴⁰⁵ Greenlots Reply Comments at 2.

⁴⁰⁶ IER Reply Comments at 1.

⁴⁰⁷ IER Reply Comments at 1.

IER provides the following bulleted list of a number of the MJ Bradley study's assumptions and claims that IER considers to be dubious:

- Most of the savings claims result from assumptions that more than 90 percent of all future EV charging occurs at off-peak residential rates in a perfect distribution across the hours from midnight to 4:00am (while comparing it to a baseline where all charging is on peak).⁴⁰⁸ This assumption not only hides all impacts to peak demand and assumes the EVs pay virtually nothing for demand charges (to pay for generation capacity) and not only hides all impacts and needs for massive upgrades to transmission and distribution, but it adds significant costs to the baseline to create nonexistent future benefits. Further, IER says that the off-peak benefits are based on charging technology, metering, and infrastructure that currently do not exist and have not been demonstrated in real-world application. The savings from lower gasoline purchases are found by assuming only off-peak EV charging at very low electricity rates. The study ignores the very large cost of commercial EV charging stations and higher impacts on-peak and costs of drawing much more power than residential chargers. The study illogically claims that off-peak charging will produce more revenue than the cost of providing the service and lower customer bills.
- The study assumes a much higher percentage of the future gasoline-fueled fleet is light trucks (more than double what is on the road today), inflating vehicle and fuel costs relative to EVs and hiding the EV cost premium by assuming trucks are more expensive; meanwhile, it assumes a reduction of 70 percent or more in EV battery costs by 2030.⁴⁰⁹
- The study assumes an unrealistic number of EVs on the road, inflating benefit estimates—6 to 10.8 percent of light duty vehicles on the road in 2030.
- It is unclear if the study assumes utilities will offer \$10,000 subsidies per EV and/or that Illinois will offer \$4,000 subsidies per EV.⁴¹⁰
- The study underestimates the electricity needed to charge EVs: no charging conversion losses or transmission losses, which collectively require 16 percent more electricity than the study's assumptions, are taken into account.⁴¹¹

⁴⁰⁸ Id. at 2.

⁴⁰⁹ IER Reply Comments at 2.

⁴¹⁰ Id.

⁴¹¹ Id. at 3.

- The study assumes gasoline prices increase 70 percent while electricity increases 10 percent.
- The study does not appear to include any EV sub-metering costs.
- The study adds upstream gasoline emissions, but no upstream emissions from EV and battery manufacturing or emissions associated with fuel production or delivery to power plants.

IER contends that the problems with the MJ Bradley study are manifold, but, fortunately, policymakers need not concern themselves with such calculations.⁴¹² At any given time, consumers are capable of deciding for themselves whether it makes more sense to buy an electric or a gasoline-powered vehicle. If indeed the typical Illinois driver will “save money” by buying an EV, then IER argues that no one on the ICC needs to tailor government policies to make that happen. It’s true that government regulation affects electrical utilities and thus the availability and rates for electricity to EV owners—which in turn influences the decision on whether to buy an EV or a gasoline-powered vehicle—but even here, IER opines that Illinois policymakers do not need to concern themselves with calculations of “net savings to drivers.”⁴¹³ IER indicates that Illinois policymakers only need to cater to cost and market demand conditions, in order to let utilities pursue profitability in the service of their customers.

IER indicates that just about all of the remaining 10 percent of estimated total benefits from the MJ Bradley study derives from alleged “social benefits” accruing to society at large from reduced GHG emissions.⁴¹⁴ IER notes that a negligible portion of the MJ Bradley study’s total estimated benefits comes from benefits to utility customers. Specifically, IER observes that the MJ Bradley study looks at two different EV penetration scenarios and estimates the incremental drop in Illinois GHG emissions, over and above

⁴¹² Id.

⁴¹³ IER Reply Comments at 3.

⁴¹⁴ Id. at 4.

the reduction that would have occurred without extra EV penetration, simply from turnover of the fleet into more advanced vehicles.

IER notes that the MJ Bradley analysis estimates a substantial annual “social value” from EV penetration, especially as we move further into the future. IER observes that the difference between the MISO and Bloomberg scenarios is due to the assumed usage of EVs in either.⁴¹⁵ These figures are calculated by taking the estimated incremental reduction in CO2 emissions (for a given scenario) and then multiplying by the “social cost of carbon” (“SCC”) as estimated by the Obama Administration.⁴¹⁶ IER contends that there are several problems with this procedure.

In the first place, IER indicates IER has published quite extensively on the flaws with the social cost of carbon concept.⁴¹⁷ IER’s most comprehensive critique is the formal Comment IER submitted to the Office of Management and Budget in early 2014. Among various problems, IER argues that the SCC is dubious as a guide to policymakers because it is extremely malleable. IER states that simply by adjusting the discount rate used in the analysis, the calculated SCC can range from several hundred dollars per ton down to \$0 or even negative—all while holding the underlying simulations of climate change identical.

Rather than being analogous to a physical constant such as the charge on an electron, IER says that the “social cost of carbon” reflects the modeling decisions of the analyst. In light of this and other objections, IER points out that the Trump Administration has considered substantially reduced estimates of the SCC.⁴¹⁸ IER notes that if these reduced estimates of the SCC had been used, the MJ Bradley study’s findings regarding the “social value” of emission reductions would in turn be substantially reduced. To reiterate, IER cautions that several of the problems they document with the SCC as a concept to guide policymakers have nothing to do with disputes over the physical science

⁴¹⁵ Id. at 4-5.

⁴¹⁶ Id. at 5.

⁴¹⁷ IER Reply Comments at 5.

⁴¹⁸ Id.

of climate change or its impact, but reflect arbitrary judgments concerning the discount rate or whether to limit the analysis to the United States as opposed to assessing effects worldwide.

However, and even more relevant for Illinois policymakers, IER argues that the estimate of a global “social cost of carbon” is virtually useless for policy changes at the state level.⁴¹⁹ This is because of the phenomenon of “leakage.” Specifically, IER says that if Illinois policymakers adopt measures that promote faster EV penetration among Illinois drivers, the reduction in emissions from the state of Illinois will be partially counterbalanced by increased emissions in other states, such as neighboring Indiana and Missouri.

IER states that if Illinois drivers accelerate their adoption of EVs, then the demand for gasoline will fall.⁴²⁰ This will slightly lower the national (and even world) price of gasoline, making it cheaper for other motorists who continue to use gasoline-powered vehicles. Therefore, IER argues that if Illinois policymakers artificially promote the use of EVs in their state, they will at the same time be encouraging drivers elsewhere to delay the adoption of EVs, because gasoline will be cheaper than it otherwise would have been.

IER contends that to the extent that global climate change is a problem, it is a global problem.⁴²¹ IER states that policy measures that affect the use of gasoline at the level of a U.S. state will be very muted, because they influence such a small proportion of the total source of emissions. For this reason alone, IER argues that the estimated “social value” of enhanced EVs in the MJ Bradley study is vastly overstated.

In Reply Comments, IIEC states that many parties claim that EVs will provide benefits to Illinois residents in various ways, via reduced emissions, greater utilization of the electric grid during off-peak hours, and additional retail rate revenue for utilities.⁴²² Regarding the latter, IIEC states that it is not guaranteed that additional rate revenue will inure to utilities, particularly if they are providing only delivery service. However, of utmost

⁴¹⁹ Id. at 6.

⁴²⁰ IER Reply Comments at 6.

⁴²¹ Id.

⁴²² Id. at 3.

importance IIEC states is to properly evaluate these alleged benefits alongside any additional costs to Illinois utility ratepayers of added EV penetration.

To the extent that the added costs incurred by the utilities to support EV load is allowed recovery, IIEC argues that such costs should be allocated and collected directly from those customers who choose to purchase or use EVs, so that the cost-benefit analysis can be conducted individually by each consumer when making the decision on their vehicle use preference.⁴²³ However, in the case that non-EV users are made to pay higher utility costs to support EV load, IIEC strongly recommends that a thorough and well-informed cost-benefit analysis predicate the Commission's approval of such cost subsidization.

Chanje's comments focus on commercial EVs for the last mile deliveries, a booming segment given the proliferation of online shopping and on-demand purchases. Chanje notes strong support for the electrification of transportation at large and emphasizes that commercial fleets be advantageous for all rate payers and the public at large.⁴²⁴

Chanje notes that key advantages of fleet electrification include:

Predictable routes/ duty cycles- last mile deliveries average 80 miles per day and even less for highly urban routes. These routes fall well within the battery range of commercial EVs because Chanje trucks range is 140 miles on a full charge. Chanje further notes, predictable routes mitigate "range anxiety," a barrier to EV adoption, and create predictable energy needs resulting in cost-saving for fleet operators and other ratepayers.⁴²⁵

Greater leverage to reduce GHG emissions and other pollutants- Commercial vehicles typically travel over 20,000 miles annually and consume more energy than light duty vehicles. Diesel trucks equivalent to Chanje's EV achieve 12 miles per gallon and a

⁴²³ IIEC Reply Comments at 3.

⁴²⁴ Chanje Reply Comments at 1.

⁴²⁵ Id.

fully charged Chanje EV has a miles-per-equivalent of 24. Moreover, commercial vehicles generally are part of a fleet, operated by an owner with multiple fleets. Policies that incentivize fleet owners to switch to electric fleets will have significant leverage in reducing emissions.⁴²⁶

Cost-effectiveness for ratepayers- Chanje notes due to the great scale and more predictable duty cycles, commercial EV fleets can be very cost effective. Infrastructure and utility assets supporting commercial EV charging will be consistent and predictable enabling utilities to maximize asset utilization rates. Furthermore, most of charging will occur overnight at time of excess capacity which ratepayers already pay for. Importantly, Chanje has found many instances where fleet charging infrastructure can be built without any utility upgrade – no additional cost to ratepayers.⁴²⁷

Chanje suggests that if policies and pricing mechanisms are designed correctly, commercial EV charging can put a downward pressure on rates for all ratepayers. Commercial EV charging can improve overall asset utilization not only through nighttime charging, but also through dynamic load management.⁴²⁸ Fleets have the potential to provide V2G services, injecting energy at critical times and under the most extreme scenario, Commercial EVs may serve as a mobile emergency backup power, providing energy to key circuits during critical peak demand or critical loads during catastrophic grid failures.⁴²⁹

Chanje strongly believes transportation electrification, especially among the commercial segment will open new opportunities to reduce emissions, but also create a more robust, reliable, and dynamic grid for all ratepayers.⁴³⁰

⁴²⁶ Id. at 1-2.

⁴²⁷ Chanje Reply Comments at 2.

⁴²⁸ Id. at 3.

⁴²⁹ Id.

⁴³⁰ Id.

In Reply Comments, ComEd notes that most commenters are supportive of electric vehicles and EV charging stations.⁴³¹ ComEd notes the recognition of the various benefits of EVs, especially reduced greenhouse gas emissions, is widespread across commenters.

In Reply Comments, Tesla notes that some stakeholders question the viability and benefits of EVs given low sales volume today. Tesla notes, the EV market is still relatively small as to percentage of total vehicles, it is beginning to scale rapidly, and consumer preference is generally shifting towards EVs.⁴³² Tesla notes that the intense consumer interest also manifests itself in recent consumer surveys that find that “the number of Americans interested in an electric vehicle approaches the number planning to purchase a pickup truck,” and interest in EVs has rapidly increased to the point that “20 percent or 50 million Americans will likely go electric for their next vehicle purchase.” Indeed, the Tesla asserts that the U.S. government itself recognizes a number of other consumer benefits from EV technology including that “plug-in electric vehicles can help increase energy security, improve fuel economy, lower fuel costs, and reduce emissions.”⁴³³

Tesla states that as consumer preference for EVs is expanding, costs for EVs especially when looking at total cost of ownership are also decreasing. From 2008 to 2017, Tesla has decreased the cost of its electric drive unit nearly 80% and projects that the cost will continue to decrease while performance continues to increase. Similarly, at the end of 2017, Merrill Lynch analysts predicted EVs in the U.S. will be cheaper than their traditional counterparts by 2024, and just the year prior they had estimated it would take until 2030. Finally, Tesla notes that Bloomberg predicts EVs may be cheaper than their petroleum counterparts by 2025 as the cost of lithium-ion batteries continues to fall.⁴³⁴

Tesla notes that many stakeholders, including Tesla, in their Initial Comments provided concrete data for the numerous economic, health and environmental benefits of EVs citing recent reports such as the MJ Bradley & Associates analysis, “Going from

⁴³¹ ComEd Reply Comments at 1.

⁴³² Tesla Reply Comments at 3.

⁴³³ Id.

⁴³⁴ Id.

Pump to Plug,” “Cleaner Cars from Cradle to Grave,” to name a few. Some Environmental groups (Sierra Club and NRDC, UCS, CUB/EDF) and ComEd note:

- Electricity costs about half of gasoline even when oil prices are low providing Illinoisans will potential to save on fuel costs with EVs and reduce overall energy costs.
- EVs produce half the global warming emissions compared to gasoline powered vehicles even with EV manufacturing emissions accounted for.
- Electrifying transportation will improve air quality, reduce climate-warming emissions if designed to utilize clean resources and shave peaks served by expensive, polluting generators.
- Even if EV owners realize a larger electric bill, this increased electricity consumption cost for energy and transportation costs is less than cost of vehicle maintenance overall.⁴³⁵

Tesla points out that stakeholders also note that EVs get cleaner as the grid resources get cleaner which is not the case for conventional vehicles. Ameren states in opening remarks, “as Illinois adds more renewables to tis mix of generation sources (solar and wind), emissions reductions will increase.” Furthermore, depending on location, a mid-size EV generates up to 67% lower GHG emissions than gasoline internal combustion engine car on a well-to-wheel basis.⁴³⁶ Thus, Tesla argues that EVs fueled by cleaner electricity sources will only continue to reduce emissions.⁴³⁷

Tesla notes, the U.S. government recognizes many benefits from EV technology including that “plug-in electric vehicles can help increase energy security, improve fuel economy, lower fuel costs, and reduce emissions.”⁴³⁸

⁴³⁵ Tesla Reply Comments at 2.

⁴³⁶ Id.

⁴³⁷ Id. at 3.

⁴³⁸ Tesla Reply Comments at 3.

EV Charging Infrastructure:

A. Describe whether more charging stations should be developed in Illinois.

The AG points out that EV charging station infrastructure is an area that is currently in flux.⁴³⁹ Importantly, the AG states that private investors are bringing a wide range of approaches to EV charging. The AG notes that there are various business models, including on-premises and in-home charging, pay-as-you-go free standing charging stations, free charging at businesses for employees or customers, free or pay charging in public and private parking lots, and free or pay charging in public spaces such as national parks and on municipal property. Notwithstanding these options, the AG indicates that the literature reports that 80% of charging is done at home. As a result, the AG contends that rate design options for utility customers, rather than development of charging infrastructure that competes with private interests, should be the focus of an EV investigation.

Ameren points out that two of the more significant barriers to EV adoption are range anxiety and lack of public charging infrastructure.⁴⁴⁰ Ameren states that there is a correlation between the number of EV charging stations and the adoption of EV vehicles. Ameren Illinois believes the deployment of EV charging infrastructure will need to lead EV adoption to eliminate this significant barrier to adoption.⁴⁴¹

The CACC claims that access to convenient, affordable charging in Illinois can expand and accelerate the EV market and support the 15,000+ existing PEV drivers who reside in 99% of Illinois' counties.⁴⁴² CACC states that the European Clean Power for Transport directive recommends that there should be one public available charging point for every 10 electric cars by 2020, also taking into consideration the type of cars, charging

⁴³⁹ AG Initial Comments at 2.

⁴⁴⁰ Ameren Initial Comments at 14.

⁴⁴¹ *Id.* at 15.

⁴⁴² CACC Initial Comments at 5.

technology and available private recharging points. CACC states that up to September 2018, there are 1,179 public charging stations that have deployed in Illinois.

CACC states that Section 1413 of the Fixing America's Surface Transportation Act ("FAST Act") calls on U.S. Department of Transportation ("USDOT") to designate zero-emission and alternative fuel corridors to ensure our nation's transportation system meets the modern and future needs of fleets and drivers.⁴⁴³ CACC notes that in response to USDOT's request for corridor nominations, the Illinois Department of Transportation submitted various applications for alternative fuel vehicle corridor designation, including for I-80 and I-94, both of which were approved by the USDOT in the first round. CACC indicates that these applications have multiple stakeholders and cross state borders in an effort to install electric vehicle supply equipment and signage. CACC states that in collaboration with USDOE, USDOT has deemed that public DCFC be no greater than 50 miles between one station and the next on the corridor and no greater than 5 miles off the highway.

CACC argues that additional DCFC is also necessary in metropolitan areas to support residents of multi-unit dwellings and the growing number of electrified high-utilization fleets such as livery, Transportation Network Providers, and delivery vehicles.⁴⁴⁴ CACC points out that Argonne National Laboratory's A-TEAM model projects with only existing charging stations, unmet charging demand in 2020 is high considering a moderate EV growth rate in the Chicago Metropolitan Statistical Area ("MSA"). CACC states that in 2020, drivers who are unable to complete battery electric vehicle trips due to a lack of public charging are more likely to be from Cook, Lake and DuPage counties. CACC notes that in 2020, demand for public charging (energy per square mile) peaks North of the Loop (Magnificent Mile, River N, Lakeview) while demand for home charging peaks North and West of the Loop (Wicker Park, Belmont, E Garfield Park). CACC states

⁴⁴³ CACC Initial Comments at 5.

⁴⁴⁴ Id.

that with DCFCs, public charging peak loads can exceed home charging peak loads in the Chicago MSA.

ChargePoint believes that it is essential that policymakers and regulators appropriately align incentives to accelerate the sustainable and scalable growth of the competitive EV charging market in Illinois. ChargePoint argues that additional electric vehicle supply equipment will be necessary to support that continued growth.⁴⁴⁵ ChargePoint states that policies and regulations to encourage the deployment of EVSE must also encourage innovation, competition, and customer choice in EV charging equipment and network services.⁴⁴⁶

ComEd states that although adoption of EVs and the availability of EV charging infrastructure are significantly increasing, they still are nascent in Illinois.⁴⁴⁷ As electric vehicle penetration increases, there will be a need for additional charging stations. There are potential opportunities to increase the number of charging stations in urban, underserved areas, as well as with multi-unit dwellings. Some factors that can be used in determining location, type, and number of the chargers are feeder loading, landmarks, population density, existing charging stations and distance to highways.⁴⁴⁸

Sierra Club and NRDC state that in order to enable EV adoption, it is critical for would-be drivers to have access to infrastructure in “long-dwell time” locations where cars are most frequently located and available for charging. Home charging is a “virtual necessity” for all EV drivers and drivers are unlikely to purchase an EV if they cannot charge at home.⁴⁴⁹ Furthermore, charging at the workplace offers an opportunity to increase EV adoption and electric miles driven as well as reduces “range anxiety”, improves EV value proposition, and can facilitate renewable integration. The evolving paradigm for charging infrastructure that comprehensively meets the needs of EV drivers

⁴⁴⁵ ChargePoint Initial Comments at 8.

⁴⁴⁶ Id. at 9.

⁴⁴⁷ ComEd Initial Comments at 1.

⁴⁴⁸ Id. at 8.

⁴⁴⁹ Sierra Club and NRDC Initial Comments at 14.

to supply Level 1 or Level 2 charging in places where people naturally park for extended periods and to supply DCFC along travel corridors to enable extended travel.⁴⁵⁰

Tesla states that the primary way to promote EV adoption and utilization is through improving access and development of EV charging infrastructure. The small number of EVs in Illinois provides an opportunity to monitor programs that increase EV adoption. The Rocky Mountain Institute, National Renewable Energy Laboratory and other studies illustrate the required steps and status of EV charging infrastructure to help increase EV adoption and maximize utilization of the electric grid.⁴⁵¹ NREL determined that to facilitate 15 million PEVS by 2030, there is potential need to develop public charging of approximately 600,000 chargers, or 40 plugs per PEV.⁴⁵² Furthermore, under the Volkswagen settlement funds allocated to Illinois, the Beneficial Mitigation Plan provides approximately 10 million to invest in light-duty zero emissions vehicle (“ZEV”) supply equipment.⁴⁵³

UCS states that timely investment in EV charging infrastructure is critical to ensure that utilities are prepared for growing EV charging loads and promote additional electrification.⁴⁵⁴ The UCS states that while utility investment is critical, other programs, like Electrify America, have already started to contribute to the build out of charging infrastructure, and private investment will also increase as EV penetration into fleets increases and improves the business case for public charging.⁴⁵⁵

In its Reply Comments, ChargePoint agrees with Sierra Club and NRDC and ATE that successful deployment of EVSE hinges on utilization but ChargePoint adds that this characterization does not consider the variety of reasons for site hosts to provide EV charging services, nor the full value stream associated.⁴⁵⁶ ChargePoint emphasizes that

⁴⁵⁰ Id. at 15.

⁴⁵¹ Tesla Initial Comments at 10.

⁴⁵² Id. at 11.

⁴⁵³ Id.

⁴⁵⁴ UCS Initial Comments at 6.

⁴⁵⁵ Id.

⁴⁵⁶ ChargePoint Reply Comments at 3.

indirect value streams are central to EV charging; for example, employers provide benefits to attract employees, apartments provide amenities to attract tenants, and local governments seek to support sustainability and economic development goals.⁴⁵⁷

As an example, ChargePoint references Tesla’s “Charge Where You Park” philosophy, which expands the types of locations that typically host refueling services, like gas stations, to include sites such as homes, workplaces, retail centers, grocery stores, town centers, movie theatres, stadiums, and so on.⁴⁵⁸

Greenlots indicates that the current particular market state of EVs, which can only be described as a market failure, is a classic situation warranting public investment and the involvement of regulated monopolies.⁴⁵⁹ Indeed, Greenlots argues that at such a stage in the market, ownership and operation of charging infrastructure – including charging stations – is an appropriate and in many respects necessary role for the utility in breaking through these barriers, accelerating the market across most market segments, creating increased competition and attracting private investment.

Greenlots suggests that a deep and flexible utility role is essential to leverage its full involvement, assets and capabilities to accelerate transportation electrification and best position ratepayers to realize the full array of benefits this technology transformation can bring.⁴⁶⁰ Whether this be the ownership of charging infrastructure or the development of rates that send better price signals to manage EV loads in ways that best support the needs of the grid, or minimizing or avoiding unnecessary grid investments by knowing where, when and how EV loads are interacting with distribution infrastructure; these and many other benefits will not be fully realized without deep and active participation by the utility, according to Greenlots.

Moreover, Greenlots says that the nature of EVSE assets, being a natural extension of existing utility infrastructure, with similar hardware, features and capabilities

⁴⁵⁷ ChargePoint Reply Comments at 3.

⁴⁵⁸ Id. at 2.

⁴⁵⁹ Greenlots Reply Comments at 4.

⁴⁶⁰ Id.

as for example smart meters, fit very well within the core competencies and capabilities of utilities.⁴⁶¹ Greenlots indicates that this is particularly true with respect to ownership and maintenance of widely-dispersed, long-lived electricity-dispensing and metering equipment, and ensuring the safety and reliability of those assets. Greenlots indicates that having existing qualified field personnel allows for this, while purchasing economics to lower costs and having relevant system, business process, software, and customer service expertise and capabilities further aligns naturally with the demands of successful EVSE deployment. Greenlots indicates that utilities are also well positioned to support the hiring and training of field support personnel and other key roles necessary to execute the electrification of transportation.

Greenlots argues that well-designed utility programs can also by and large extend the same type of reliability to EV charging infrastructure that ratepayers expect for all other utility services. Greenlots observes that a badly undervalued aspect of the EV charging equipment and services market is the cost associated with keeping equipment up and running and repairing or replacing it quickly if and when it encounters an issue. Greenlots says that while early adopters of EVs may tolerate the often-poor reliability associated with much of the charging infrastructure that is deployed today, the broader market likely will not. Moreover, as the demands on EVSE deployments increase with more EV drivers on the road, many of the factors that lead to poor reliability may compound. According to Greenlots, this therefore represents a key barrier to widespread transportation electrification. To achieve the level of reliability drivers currently experience and expect from traditional fueling stations, much more needs to be done. Greenlots believes that utility program investment offers opportunity for electric vehicle service providers and contractors to benefit from a more accurately valued maintenance service that will not only improve reliability of EVSE within the utility program, but will likely extend

⁴⁶¹ Greenlots Reply Comments at 4.

beyond the bounds of the program to benefit EV charging equipment and service providers in the market as a whole.

According to Greenlots, without an integrated, holistic approach developed by the utility, the ability of the EV consumer to engage suffers, with the EV charging space fragmented by geography, market segment, business structure and sales priorities.⁴⁶² Greenlots claims that the end consumer (the driver) can become frustrated as a result of this fragmented and disparate approach. However, Greenlots suggests that the utility stands in a unique and powerful position to help resolve these issues with a more comprehensive, structured and rational approach that overcomes barriers to market growth and ensures and maximizes benefits to all ratepayers.

Without prescribing a specific role for the utility within the broad context of market accelerator, Greenlots believes that providing flexibility and appropriate incentives for the utility, including recovery in rates of prudently incurred costs, to self-select the role(s) that best fit(s) its distribution system, customers, and future planning is essential to helping motivate the utility to be excited about its involvement in accelerating the market.⁴⁶³ Greenlots observes that a rural service area faces different challenges than does an urban one, and utilities should be afforded the ability to explore the different solutions and program designs that may best address the differing service area factors.

Greenlots asserts that it is clear that the deeper the utility role, the greater the benefit to ratepayers, EV drivers, auto manufacturers, and indeed EV charging companies.⁴⁶⁴ Greenlots states that ratepayers benefit in many ways, but the ability of the utility to minimize costs associated with unmanaged charging and maximize positive load shape is key to realize the greatest depth of benefits to ratepayers. This implicates active management and visibility, though Greenlots points out that utility management does not necessarily require full asset ownership. Greenlots notes that EV drivers benefit the most from the deployment of an adequate volume of charging infrastructure that is well maintained and reasonably priced. These are implicit characteristics of infrastructure

⁴⁶² Greenlots Reply Comments at 5.

⁴⁶³ Id.

⁴⁶⁴ Id.

owned and managed by utilities, according to Greenlots. Critically, this infrastructure deployment allows the barrier of range anxiety to be eliminated. Greenlots notes that auto manufacturers are focused on selling vehicles and with a few exceptions have not made meaningful investments in charging infrastructure. Greenlots states that the existing lack of infrastructure has been a primary barrier for auto manufacturers to assess demand for electric vehicles and has slowed down investment, planning, and development in electric models. An adequate volume of charging infrastructure means that auto manufacturers can focus on non-infrastructure barriers such as model availability, dealership training, marketing, etc.

Greenlots points out that charging software and hardware providers benefit directly from utility ownership by competing for the utility's business in the procurement of charging products and services.⁴⁶⁵ Direct utility procurement results in a marketplace with decisions based upon features, functions, track record, and price, allowing players of different shapes and sizes to participate with a leveled playing field, according to Greenlots. Greenlots suggests that the adoption of open standards maximizes the initial and ongoing competition for both hardware and software products and services. Beyond direct utility procurement, Greenlots suggests that other market participants benefit from improved economics associated with investing in charging infrastructure, as the utility investment accelerates EV adoption, thereby increasing utilization of non-utility infrastructure. According to Greenlots, this results in increased opportunities for all market participants, positioning utility investment – including utility ownership – as a market catalyst, rather than a market constraint.

In their Reply Comments, Sierra Club and NRDC emphasize that utilities are in the best position to support early deployment of EV charging infrastructure, especially at sites where private build-out is not feasible, like at multi-unit dwellings.⁴⁶⁶ Sierra Club and the NRDC add that while some EV NOI participants raised concerns regarding competition

⁴⁶⁵ Greenlots Reply Comments at 6.

⁴⁶⁶ Sierra Club and NRDC Reply Comments at 5.

from utilities that would stifle private investment, EV charging providers themselves did not share those concerns but rather, those participants encouraged utility involvement.⁴⁶⁷

a. What external sources could be used to identify the optimal ratio of EVs to charging stations?

ATE recommends the utilities first analyze their specific distribution grid for their service territory and the likely number of customers to adopt EVs. Utilities in consultation with EV infrastructure firms, other vendors, and EV stakeholders should make a good faith effort to estimate the types of charging infrastructure that will be required ranging from residential, workplace, to DCFC stations.

Tesla states that EVI-Pro, a tool developed by NREL, determines a baseline of charging infrastructure needed to support a percentage of EVs. The baseline should be tied to Illinois goals and current market trends. Utilities may also provide recommendations for charging infrastructure tailored to their service territory.⁴⁶⁸

The UCS states that the EV Infrastructure Projection Tool (“EVI-Pro”) Lite from the U.S. Department of Energy Alternative Fuels Data Center can assist in determining the relative quantities of public DCFC and Level 2 charging and workplace charging needed for a state or city based on given total numbers of electric passenger cars and light trucks.⁴⁶⁹ The UCS states that this tool highlights the need for diverse charging options, including home, work, and public charging.⁴⁷⁰

In his Reply Comments, Dr. Santini indicates that the workplace appears to be the best location for aggregation and coordinated control of many fleets.⁴⁷¹ Dr. Santini notes that there are management costs involved in aggregation that are not folded into cost analysis, such as loss of employee time while moving multiple vehicles to make best use of Level 2 charging ports during a workday.⁴⁷²

⁴⁶⁷ Sierra Club and NRDC Reply Comments at 5.

⁴⁶⁸ Tesla Initial Comments at 11.

⁴⁶⁹ Union of Concerned Scientists Initial Comments at 6.

⁴⁷⁰ Id.

⁴⁷¹ Santini Reply Comments at 8.

⁴⁷² Santini Reply Comments at 8.

- b. Describe the rate at which additional public charging infrastructure needs to be developed to meet the demand of increasing numbers of EVs in Illinois.

ABB states that fast deployment of public charging is needed to meet growing demand because availability of public charging infrastructure is widely known to be among the top considerations for consumers and fleet electrification.⁴⁷³

Ameren claims that public infrastructure deployment may serve to reduce public fears of being left stranded away from home, also known as range anxiety.⁴⁷⁴ Ameren states that the added “safety net” may encourage customers to embark on longer driving excursions, even if the public does not regularly use the public charging stations.

Ameren states that the rate at which public charging will need to develop will depend on the rate of EV adoption.⁴⁷⁵ Ameren Illinois believes that in order to enable EV adoption the public charging infrastructure will need to lead EV adoption so any positive rate of development of public charging infrastructure will be beneficial.

ATE states that the Commission should take a “portfolio approach” which includes a comprehensive plan of all types of charging with a focus on public non-resident Level 2 charging and DCFC.⁴⁷⁶

Tesla states that any deployment ratio considerations include majority of charging takes place at home, access to charging where you park with a focus on Level 2 infrastructure to provide expanded access today.⁴⁷⁷

- c. To what extent and at what rate do customer-owned chargers need to be developed?

Ameren argues that one of the many benefits of EVs is the ability for customers to conveniently charge them at home and skip the gas station.⁴⁷⁸ Ameren states that EV

⁴⁷³ ABB Initial Comments at 7.

⁴⁷⁴ Ameren Initial Comments at 15.

⁴⁷⁵ Id.

⁴⁷⁶ ATE Initial Comments at 10.

⁴⁷⁷ Tesla Initial Comments at 11.

⁴⁷⁸ Ameren Initial Comments at 15.

owners typically do most of their charging at home (about 80% to 90%). Ameren states that it is anticipated that EV owners will install charging infrastructure as they are adopting EVs. This brings to question how customers who live in apartments will have access to home charging. It is Ameren Illinois' belief that the vast majority of charging will occur at the home, so customer access to home charging will be essential to EV adoption.

Tesla states that charger ownership is not as relevant as access opportunities and customer choice.

B. Identify the costs associated with installing additional charging infrastructure throughout the state. Assume that installation includes distribution build out, customer make-ready work, and charging equipment.

ABB states that public charging infrastructure can vary widely in cost and depends on a variety of factors, including number of chargers, capacity of chargers, siting, usage patterns and needs of customers, and charging technology, amongst others.⁴⁷⁹

Ameren states that it has not done an analysis to determine the costs associated with installing additional charging infrastructure throughout the state.⁴⁸⁰ Ameren notes that costs would vary by specific location and application.

ATE states that the cost of installation will vary significantly depending on the type of end-user (residence, commercial, Level 2 Public, and DCFC), the price and terms of real estate, the amount of trenching needed, panel upgrades needed, and a host of other factors. The cost of installation will vary depending on cost of living and electrician costs being more expensive in the city, less expensive in towns and more inexpensive in rural areas. Averages can be made for statewide purposes and regulatory tariff purposes and to establish the level of an average customer contribution for installation and average level of a rebate to the customer for both installation costs and purchase of EVSE.⁴⁸¹ For Residential Charging Costs ATE refers to Avista Pilot Program in Washington, which is an own and operate model.

⁴⁷⁹ ABB Initial Comments at 7.

⁴⁸⁰ Ameren Initial Comments at 16.

⁴⁸¹ ATE Initial Comments at 12.

ComEd indicates that currently the make-ready work and cost of EVSE equipment is borne by the individual customer or entity installing the charging infrastructure, as well as any applicable financial incentives or rebates. With respect to utility-related charges any “standard” distribution equipment that must be installed by the utility as a result of the charging infrastructure goes into rate base and the attendant costs allocated to the applicable classes when setting rates. However, any distribution equipment that would be considered “non-standard” is recovered through a contract (Rider - Nonstandard Services and Facilities) between the utility and the customer installing the charging infrastructure. Additionally, any significant investments in distribution infrastructure, such as line extensions or substation upgrades, may require refundable deposits made by the customer to the utility under (Rider DE – Distribution Extension).⁴⁸²

Tesla states that components of deploying charging infrastructure have various costs. Factors include, site specific factors such as location of charging station, proximity to electric service, whether new service connection is needed, charging stations use, and others.

Tesla notes that the average cost of charging equipment has been quantified by Idaho National Laboratory and recent California utility filings illustrate detailed costs estimates in quarterly reports.⁴⁸³

- a. Describe who would carry the costs of each aspect of building additional charging infrastructure.

Ameren suggests that for charging equipment, the owner of the charging equipment would be responsible for this cost.⁴⁸⁴ For make-ready work, Ameren states that the owner of the charging equipment would be responsible for this cost. For

⁴⁸² ComEd Initial Comments at 9.

⁴⁸³ Tesla Initial Comments at 12.

⁴⁸⁴ Ameren Initial Comments at 16.

distribution build out, Ameren states that the cost responsibility will be determined based on the utility line extension policy approved by the Commission.

ChargePoint explains that the costs associated with installing EVSE can be broadly categorized as distribution buildout, or service; customer make-ready work, or the electrical facilities on the customer's side of the meter; and the EV charging equipment and network services themselves.⁴⁸⁵

Tesla states that cost carriers include, utilities, charging providers, state and local governments, and private entities. Tesla advocates for utilities to cover make-ready infrastructure costs and components of charging equipment, including charging equipment rebates with recipient contribution requirements.⁴⁸⁶

b. Describe whether ratepayer funds would pay for any aspect of building charging infrastructure.

Ameren indicates that capital costs that are recoverable from customers would be used to fund a portion or all of the distribution system build out, consistent with existing line extension and system improvement policies.⁴⁸⁷ Ameren states that it may be beneficial or even necessary to provide incentives to the market to ensure sufficient levels of EV charging infrastructure. Ameren notes that incentives could come from the state or federal governments (e.g., in the form of tax credits). Ameren notes that utility capital expenditures (which would be fully recoverable from customers) could also be used to fund a portion or all of the distribution system build out and/or make-ready costs, assuming the ICC approves line extension and system improvement tariffs with those provisions. Alternatively, Ameren states that utilities could provide ICC-approved rebates (with costs recovered in utility rates) to owners of charging equipment. Ameren states that

⁴⁸⁵ ChargePoint Initial Comments at 9.

⁴⁸⁶ Tesla Initial Comments at 12.

⁴⁸⁷ Ameren Initial Comments at 16.

many electric utilities are offering, or proposing to offer, incentives for customers to install EV charging stations using customer funds (see Appendix to Ameren Initial Comments).

Regarding ratepayer rights and laws, AFPI notes that the ICC is required to prevent discriminatory practices where captive electric utility customers are forced to underwrite a distribution utility incursion into the EV charging infrastructure market.⁴⁸⁸ The AFPI states that utilities are in the business of providing safe, adequate and reliable electricity service.⁴⁸⁹ As such, the AFPI states that utilities should not be given authority to recover costs of investments that go beyond supplying electricity to the customers' meters.⁴⁹⁰

AFPI states that investments in infrastructure would predominantly, if not exclusively, benefit only a subset of mostly affluent customers.⁴⁹¹ This, AFPI states, is unfair and violates the equal rights of ratepayers under the law.⁴⁹²

AFPI explains that venture capital investors and automotive companies have spent billions of dollars to develop EV infrastructure.⁴⁹³ Thus, AFPI states that there is no need to shift these costs to ratepayers.⁴⁹⁴

Lastly, AFPI states that no market barriers exist to the deployment of EV charging stations in Illinois.⁴⁹⁵ Thus, AFPI states that asking ratepayers to be responsible for the cost of future programs cannot be justified.⁴⁹⁶

ChargePoint recommends that the Commission establish clear regulatory guidelines and criteria to evaluate whether it would be appropriate to use ratepayer funds to pay for portions of EV charging infrastructure. ChargePoint lists criteria established by several jurisdictions for regulators to evaluate such programs.⁴⁹⁷

⁴⁸⁸ AFPI Initial Comments at 1.

⁴⁸⁹ Id.

⁴⁹⁰ Id.

⁴⁹¹ Id.

⁴⁹² Id.

⁴⁹³ AFPI Initial Comments at 1.

⁴⁹⁴ Id.

⁴⁹⁵ Id. at 2.

⁴⁹⁶ Id.

⁴⁹⁷ ChargePoint Initial Comments at 10

From ChargePoint's perspective, utility programs that appropriately make use of ratepayer funds share a set of common principles that the Commission should consider. Namely, successful utility transportation electrification programs maintain customer choice, encourage innovation, and stimulate competition; leverage matching payments from site hosts, whenever possible; support site-host access and control over pricing; avoid island networks and ensure open access for EV drivers; support equitable access to electric transportation options; and encourage smart charging behavior to enable widespread grid benefits.⁴⁹⁸

Tesla states that EV investments in charging infrastructure benefit all ratepayers. Utilities should utilize ratepayer funds to drive transportation electrification with prudent metrics to ensure beneficial investments.⁴⁹⁹

In their Reply Comments, Tesla cites EVgo's Reply Comments that generally, one area where there is consensus on utility investment is "make ready" infrastructure.⁵⁰⁰ Tesla asserts, at the current stage of the EV market in Illinois, providing access to charging infrastructure including make-ready, especially for multifamily buildings and workplace, is critically important and the Commission can encourage utility investment in make-ready infrastructure, which can complement private investment in charging infrastructure and leverage other public funds.⁵⁰¹

In their Reply Comments, UCS states that electric utilities are an essential early investor in EV infrastructure.⁵⁰² In doing so, UCS asserts that utilities create a virtuous cycle of infrastructure investments that enable electric vehicle adoption that will eventually cultivate a competitive market for electric vehicle charging. UCS encourages the Commission to work with utilities proactively to implement transportation electrification programs that result in benefits for ratepayers and all Illinoisans.

⁴⁹⁸ Id. at 10-13.

⁴⁹⁹ Tesla Initial Comments at 12.

⁵⁰⁰ Tesla Reply Comments at 4.

⁵⁰¹ Id.

⁵⁰² UCS Reply Comments at 8.

C. Describe whether additional charging stations should be installed in densely populated areas, in areas outside densely populated cities, or both.

ABB states that charging stations are needed in both scenarios and less populated areas should not be disadvantaged over populated regions.⁵⁰³ ABB suggests that cities may require more low power charging for high density parking applications, office buildings, multi-unit dwellings and overnight flights, they will also require some “metro” DCFC stations for parking use cases where drivers stop for an hour or two.⁵⁰⁴ ABB notes that the highest power charging stations will be needed along highway corridors and to support fleets wherever they are.⁵⁰⁵

Ameren believes that additional charging stations should be installed in both densely populated areas and in areas outside densely populated cities. Ameren states that charging stations should be strategically installed in both densely and sparsely populated areas along main travel corridors to support long distance EV use.⁵⁰⁶ Charging stations serve two main functions: 1) to reduce “range anxiety” and provide assurance to those traveling across the area that they will not find themselves stranded, and 2) to provide charging services to those that do not have home or workplace charging. In addition, Ameren believes that long distance corridor charging is critical in supporting the viability of EV ownership and supporting long-distance trips across Illinois.

ATE argues for public charging stations in densely populated areas. ATE explains that Illinois will need a mix of charging types. ATE notes that DC fast chargers may present a better use case in a dense urban area but issues are complex with factors such as siting, location, public policy, and the greater penetration of TNC’s (transportation network companies) based on EVs.⁵⁰⁷ ATE also suggests that such charging stations

⁵⁰³ ABB Initial Comments at 7.

⁵⁰⁴ Id.

⁵⁰⁵ Id.

⁵⁰⁶ Ameren Initial Comments at 17.

⁵⁰⁷ ATE Initial Comments 13.

could be sited to serve the needs of people who live in multi-unit dwellings where it is difficult to persuade the landlord or tenants to install a charging station. ATE notes it may also be appropriate for disadvantaged communities or low income communities in which either a garage is not available or a curb-side location at the residence is not permitted.

ChargePoint argues that it is in the public interest to support the deployment of additional charging infrastructure in urban, suburban, and rural areas.⁵⁰⁸

ComEd states that additional charging stations are needed in both urban and rural areas. Installing additional charging stations in densely populated areas would not only increase the visibility of electric vehicles but provide a greater number of EV owners with more charging options, while installing them outside densely populated areas would allow EV owners the ability to travel greater distances and help mitigate “range anxiety”.⁵⁰⁹

EVgo states that it is also important to site DC fast chargers in high density locations with a high concentration of multi-unit dwellings so that renters and those without a dedicated parking spot may access a public charger.⁵¹⁰

Tesla states that access to charging infrastructure is needed in urban and non-urban areas, a network for long distance travel fosters EV ownership and investment in Level 2 charging infrastructure for multifamily buildings and workplaces is critical, while also encouraging public charging station development.⁵¹¹

- a. Describe how EV charging infrastructures could penetrate low income communities that generally do not have high EV adoption.

ABB states that lower income residents generally have less access to individual charging stations for overnight charging where a dedicated garage and installation are required.⁵¹² Thus, multi-family housing charging and community DCFC stations become

⁵⁰⁸ ChargePoint Initial Comments at 14.

⁵⁰⁹ ComEd Initial Comments at 9.

⁵¹⁰ EVgo Initial Comments at 2.

⁵¹¹ Tesla Initial Comments at 12.

⁵¹² ABB Initial Comments at 8.

more necessary.⁵¹³ ABB urges that charging programs with public or utility funding should be encouraged to serve those needs.⁵¹⁴

Ameren claims that low-income communities may have low adoption rates of EVs for a number of reasons, and they can live in areas disproportionately impacted by air pollution from the transportation sector.⁵¹⁵ One of the primary reasons for this Ameren believes could be the cost of EVs. Ameren indicates that adequate attention given to this customer class can prevent the marginalization of large portions of the population in relation to this important technology. EV-charging infrastructure could penetrate low-income communities in a number of ways. For example, Ameren opines that Illinois policy can support the build-out of public charging infrastructure that is to be used by ridesharing or car-sharing programs; and infrastructure for mass transit. These policies Ameren argues can provide the benefits of EVs to those who may not own a car.

ChargePoint argues that it is essential that advances in transportation electrification be equitably accessible to everyone in Illinois.⁵¹⁶

ComEd believes that a utility program that serves all its customers and demographics could provide EV charging infrastructure to low-income communities not currently being served by the competitive EV charging market, which will also encourage further EV adoption in the community. In addition, EV charging infrastructure can support the further penetration of electrified transportation options such as buses and trains, which can serve the breadth of the population.⁵¹⁷

Tesla states that it is very important to provide charging access in low income communities.⁵¹⁸

⁵¹³ Id.

⁵¹⁴ Id.

⁵¹⁵ Ameren Initial Comments at 17.

⁵¹⁶ ChargePoint Initial Comments at 14.

⁵¹⁷ ComEd Initial Comments at 9.

⁵¹⁸ Tesla Initial Comments at 13.

D. Discuss ownership of charging stations.

ABB states that it is supportive of all ownership models if they include proper operational planning and customer-focused implementation.⁵¹⁹

CUB/EDF note that the discussion around charging infrastructure should not be dominated by the question of ownership. CUB/EDF believes that the more relevant question for consumers and the grid is whether load is managed cost-effectively.⁵²⁰

EVgo states that from their experience installing more public fast charging stations across the country than any other company, utilities have been, and are, a critical partner in the EV charging space. Utilities are a key stakeholder when it comes to EV charging. Not only do utilities need to provide the interconnection for fast chargers and be part of the siting conversation as charging stations move to higher and higher power levels, but many utilities themselves are seeking approval from their regulators to invest directly in EV charging infrastructure.⁵²¹

EVgo states that they will continue to invest and grow EVgo's nation-leading public fast charging network, but utilities and other charging companies can and will invest in public charging infrastructure. The key for regulators and other policymakers is to recognize how utility investment can complement and encourage private competition.⁵²²

EVgo believes that there is consensus on utility investment in the "make-ready" infrastructure. EVgo states that utilities investing in the conduit and other electrical infrastructure leading up to the charger is a win-win. EVgo notes that the utility gets to focus on its core competency, enable more demand for them to serve, reduce capital costs for third party charging companies, and increase private investment.⁵²³

⁵¹⁹ ABB Initial Comments at 8.

⁵²⁰ CUB/EDF Initial Comments at 4.

⁵²¹ EVgo Initial Comments at 1.

⁵²² Id.

⁵²³ Id.

EVgo indicates that another challenge could be the utility investing in areas already served by the private market, such as rideshare and dense urban cores. Such approaches may threaten the viability of individual businesses with thin margins. EVgo indicates that utilities should work in partnership with experienced EV charging partners to deliver the infrastructure EV consumers need in a driver-centric manner.⁵²⁴

Tesla states that the Commission should provide utilities with general guidelines about their role in increasing access to charging infrastructure, how costs are recovered such as designing charging station rate programs, examining line extension policies, and how and when utilities may invest in charging stations to remove barriers to EVSE deployment. Tesla's charging stations are not intended to be a profit center, Tesla welcomes all investments from utilities and like providers, and competition will improve customer access to charging, network reliability, and provide greater user experience.⁵²⁵

In their Reply Comments, AFPI states that the cross-subsidization that would inevitably result from utilities owning and/or operating charging infrastructure is only intensified by the structure of incentives that would come as a result, where the risk-free decisions of guaranteed rate of return of monopolies will inevitably result in suboptimal investment decisions, compared to those of private sector actors and is unjustifiable as the expense of the equal rights of the people of Illinois.⁵²⁶

- a. Discuss whether utilities should own charging stations. Explain why or why not.

ATE states that utilities should be allowed the option to own and operate a portfolio of charging stations and EVSE and should provide a robust role in the planning and operation of these network management systems. Any rules constraining the utility role should be addressed and resolved so utilities can fully participate in EV infrastructure deployment.⁵²⁷

⁵²⁴ Id.

⁵²⁵ Tesla Initial Comments at 13.

⁵²⁶ AFPI Reply Comments at 2.

⁵²⁷ ATE Initial Comments at 13.

ComEd believes that utility ownership of public use charging stations is indeed an important element for the advancement of electrification of the transportation sector. In particular, while not limited to any specific market or purpose, utility ownership could assist with placement of charging stations in areas that are underserved. Generally, underserved areas lack access to places to charge because they do not have garages or home charging equipment. Underserved market segments could include renters, low income neighborhoods, multi-unit dwellings, and curbside charging. An increase in the number of public charging stations, combined with educational programs, would likely help build EV awareness and expand access to charging opportunities.⁵²⁸

CUB/EDF argue that utilities may have the information and resources to plan and deploy EV charging infrastructure in an organized, intentional manner, but allowing utilities to crowd out private competitors could have a chilling effect on private investment and innovation. There also is a risk of utilities investing in charging stations that are not used enough to justify the costs or imposing infrastructure costs on ratepayers who do not benefit from them. CUB/EDF caution against creating a profit incentive for utilities to overbuild. Utility investment might be an appropriate approach to building necessary charging infrastructure in areas demonstrated to be inadequately served by private investment, such as low-income and/or rural communities.⁵²⁹

Siemens' position is utilities should be permitted to own chargers in order for EV owners and ratepayers to receive greater benefits at lower costs from EV adoption as well as to drive grid benefits.⁵³⁰

Sierra Club and NRDC indicate that in order to evaluate utility ownership EVSE goals of utility EVSE engagement are helpful. Such goals include deployment of EV charging infrastructure that is:

- (a) equitable, reaching underserved markets

⁵²⁸ ComEd Initial Comments at 10

⁵²⁹ CUB/EDF Initial Comments at 4.

⁵³⁰ Siemens Initial Comments at 2.

- (b) complementary to competitive EV charging market
- (c) ensures new load is robustly managed
- (d) leverages limited ratepayer dollars as far as possible
- (e) properly incentivizes utilities to make effective investments
- (f) delivers a positive experience to site hosts and EV drivers⁵³¹

Sierra Club and NRDC note that with regard to equity and ensuring benefits to underserved market segments, there is a particularly compelling case to allow utility ownership option for utility programs targeting multi-family dwellings. A full utility ownership model may be valuable in reaching this presently underserved market. Another option for EV ownership among multi-dwelling units without off-street parking is to provide rebates for public fast charging located near high concentrations of apartment buildings.

Sierra Club and NRDC assert that with regard to impacts on competition and the development of a competitive EV market, the most salient issues around utility ownership is the pricing to drivers at DCFC stations. If the pricing is too low, private market entrants will not be able to compete on price; too high, and drivers will avoid stations.⁵³²

Sierra Club and NRDC state that with regard to facilitating EV load management, a utility ownership model is not decisive, but may affect how load management is structured. Where utilities own and operate stations, they can develop managed charging programs or seek approval for rate designs that incentivize desired charging behavior at those stations. Utility ownership can facilitate effective load management, but load management goals can be achieved under other ownership models as well.⁵³³

According to Sierra Club and NRDC, with regard to cost-efficacy and maximizing the impact of limited ratepayer dollars, program design considerations should be emphasized over ownership model type.⁵³⁴

⁵³¹ Sierra Club and NRDC Initial Comments at 15.

⁵³² Sierra Club and NRDC Initial Comments at 15.

⁵³³ Id. at 16.

⁵³⁴ Id.

In their Reply Comments, ChargePoint urges the Commission to disregard Siemens and ATE in recommending authorizing utility ownership at the exclusion of considering other factors.⁵³⁵ Instead, ChargePoint agrees with ComEd, AG, CUB/EDF, and Tesla in considering the context and balancing interests, like authorizing utility ownership to assist with placement of charging stations in areas that are underserved.⁵³⁶ ChargePoint also agrees with Sierra Club and NRDC that utility-owned DCFC stations could put private market entrants out of business if they offered prices too low.⁵³⁷ Thus, ChargePoint recommends that the Commission should consider the need for site hosts to have control over pricing.⁵³⁸ As a reference, ChargePoint indicates that San Diego Gas & Electric's "Power Your Drive" program and Pacific Gas & Electric's EV Charge network provides site hosts with choice in and control of EV charging equipment and network services and provides an option for utilities to own the station itself.⁵³⁹ These programs could serve as reference for Illinois.

b. Discuss whether third party vendors should own the charging stations.
Explain why or why not.

Ameren Illinois supports a market approach for EV charging infrastructure with customers, including new third-party vendors, owning public charging infrastructure.⁵⁴⁰ This market approach, Ameren argues, should not preclude utility ownership of public charging infrastructure in areas where the market is slow or fails to develop.

ChargePoint believes that there is a vital role for utilities in supporting efficient integration of EV load and that the right program design can encourage the installation of

⁵³⁵ ChargePoint Reply Comments at 6.

⁵³⁶ ChargePoint Reply Comments at 6.

⁵³⁷ Id. at 7.

⁵³⁸ Id.

⁵³⁹ Id.

⁵⁴⁰ Ameren Initial Comments at 17.

more charging stations around the state in a manner that complements, and does not duplicate or conflict with, the private market.⁵⁴¹

ComEd indicates that currently, third parties own charging stations in Illinois. A combination of utility and privately-owned charging stations is a possible solution, ensuring equitable access to maximize benefits to all.⁵⁴²

CUB/EDF generally expect to see third parties taking on the financial risk of investment themselves and allocating resources accordingly as a more cost-effective solution that avoids potential cross-subsidies. The most appropriate means of incentivizing charging infrastructure requires extensive additional consideration.⁵⁴³

E. Describe whether charging stations should consist of DC Fast Chargers, slow chargers, or a mixture of both. Explain why.

ABB states that a mixture of all levels of charging speed and power is required because a “one-size fits all” charging infrastructure is never sufficient.⁵⁴⁴

Ameren argues that the charging stations will require a mix of Direct Current Fast Chargers (“DCFCs”) and slow chargers.⁵⁴⁵ Ameren states that the type of charger will depend on the type of charging (home or public) and will need to take into account the charging capabilities of the various EVs on the road and the customer charging preference. For example, Ameren opines that chargers in a charging corridor will likely need to be DC fast chargers to facilitate EV owners wanting to charge as quickly as possible so they can get back on the road, while chargers in shopping malls could be slow chargers for customers who want to top off their batteries while they shop.

ATE states DCFCs address the serious concern of “range anxiety” and they may be part of a viable portfolio approach of charging infrastructure that meets the needs of

⁵⁴¹ ChargePoint Initial Comments at 14.

⁵⁴² Id.

⁵⁴³ CUB/EDF Initial Comments at 4.

⁵⁴⁴ ABB Initial Comments at 8.

⁵⁴⁵ Ameren Initial Comments at 18.

all classes of customers, including potentially the low-income and disadvantaged communities as well.⁵⁴⁶

ChargePoint encourages the Commission to avoid a “one-size-fits-all” approach to EV charging equipment and network services. The charging needs for light, medium, and heavy-duty vehicles vary wildly.⁵⁴⁷

ChargePoint argues that while typical EV charging needs can be met by AC Level 2 charging stations, DCFC stations will continue to play an integral role in supporting EV adoption by extending range along highway corridors and in dense urban environments where dedicated parking is often unavailable.⁵⁴⁸

ComEd states that as EVs become an increasingly significant way that people and goods are transported, a variety of charging stations will be needed to serve different uses. Though slow chargers categorized as Level 1 and Level 2 have a lower up-front cost, DCFC stations have the capacity to fully power more vehicles per dollar invested. Thus DCFCs, while costlier initially, offer the customer the benefit of fast charging and the investors financially benefit from repeated and extended use. A new, even faster charging technology, XFCs, might also be optimal in certain situations, providing the same benefits as the DCFCs, possibly even to a greater degree. Though slower charging stations may be sufficient to serve most residential users, other users, such as emergency response organizations, larger vehicles like buses or trucks, or some commercial organizations, may require faster charging capabilities.⁵⁴⁹

EVgo states that charging stations should consist of chargers that are appropriate with respect to the geographic placement of any given station. Slow chargers (Level 2) can be appropriate for individual residences and workplaces where EV drivers will ostensibly park their vehicle to charge for several hours.⁵⁵⁰

⁵⁴⁶ ATE Initial Comments at 14.

⁵⁴⁷ ChargePoint Initial Comments at 17.

⁵⁴⁸ ChargePoint Initial Comments at 18.

⁵⁴⁹ Id.

⁵⁵⁰ EVgo Initial Comments at 2.

EVgo states that DCFC, on the other hand, is more appropriate for short 20, 30, 45, or even 60-minute charges, and fast charging stations are therefore frequently sited in locations where the charging experience can be integrated into an EV driver's daily life, such as a retail center where customers can charge while they shop.⁵⁵¹

Dr. Santini recommends that utilities should focus on quality assured, passive control, safe, low-power charging stations for plug-in hybrids at the residence.⁵⁵² According to Dr. Santini, this strategy will have the potential to benefit the grid and make use of existing wind generation at very low costs.⁵⁵³ Dr. Santini adds that, although not a priority at this time, the development of higher-power charging stations with active control is desirable in the long term to increase the capture of wind and solar energy.⁵⁵⁴ The power and energy flexibility provided by the large battery packs is ideal for the deployment of all-electric and range-extended EVs.⁵⁵⁵

Tesla states that a combination of DCFC and Level 2 chargers should be deployed. For most drivers, the best place to charge is where you park. Level 2 chargers should be deployed at homes, multifamily buildings, workplaces, public destinations, schools, retail centers, parks and other facilities. DCFC is utilized best for long distance travel.⁵⁵⁶ The opportune time to charge a car is when cars sit idle at home, work or stores.

In their Reply Comments, ChargePoint notes that DCFC stations will have a more acute challenge due to low utilization and traditional, demand-based rate structures.⁵⁵⁷ However, the challenge can be overcome by aligning electricity rates with their end use and avoiding inadvertent penalization of site hosts for low utilization.⁵⁵⁸

⁵⁵¹ Id.

⁵⁵² Santini Initial Comments at 1.

⁵⁵³ Id.

⁵⁵⁴ Id.

⁵⁵⁵ Id.

⁵⁵⁶ Tesla Initial Comments at 13.

⁵⁵⁷ ChargePoint Reply Comments at 3.

⁵⁵⁸ Id.

In his Reply Comments, Dr. Santini notes that all-electronic homes with electric heating provide the least costly opportunities for higher kW Level 2 charging.⁵⁵⁹ He states that even after determining the most cost-effective locations for controllable Level 2 supply equipment, utilities still need the cooperation and support from vehicle manufacturers.⁵⁶⁰

F. What other utility service options, especially those currently offered in other jurisdictions, could promote EV adoption?

ABB states that education, rate design, and smart charging incentives are effective ways that utilities can promote EV adoption.⁵⁶¹

Ameren claims that utilities could partner or even form a coalition with third parties and local governments to strategically plan, site, and construct charging stations that take advantage of existing electric infrastructure in the cities and towns served by the utilities.⁵⁶² See the Appendix to Ameren's Initial Comments for a table that depicts utilities in other jurisdictions that offer, or propose to offer, incentives to encourage customers to install EV charging stations.

ATE states EVSE infrastructure cost, rate design, and public policy issues should be dealt with openly in a tariff filing in a process chosen by the Commission.⁵⁶³

ComEd states that other utility service options that could help promote EV adoption include, but are not limited to:⁵⁶⁴

- time of use rates;
- limited duration demand holidays;
- rebates for EVs and charging stations;
- EV-related education and awareness events and literature;
- rewards programs for optimizing charging behaviors;
- rebates for public transportation (e.g., electric buses and batteries);
- demand management/response through battery storage; and

⁵⁵⁹ Santini Reply Comments at 7.

⁵⁶⁰ Santini Reply Comments at 7.

⁵⁶¹ ABB Initial Comments at 8.

⁵⁶² Ameren Initial Comments at 18.

⁵⁶³ ATE Initial Comments at 14.

⁵⁶⁴ Id. at 10-11.

- emergency road-side charging.

Dr. Santini references four programs that aim to promote further EV adoption in Minnesota, Texas, and New York.

First, Dr. Santini describes the Dakota Electric Co-op program “Revolt”, by Minnesota’s Great River Energy. Dr. Santini states that this experimental program promises plug-in vehicle owners that the energy they purchase will come from all renewable wind energy.⁵⁶⁵ Dr. Santini explains that there are two different rates; the first is the least cost “off peak storage” rate, which requires that charging only occur from 11 pm to 7 am.⁵⁶⁶ The second rate option is “time of use” charging at any time of day. Rates differ based on time of day and season; overnight rates (9 pm – 8 am) on weekdays are 6.74 cents/kWh, while charging at this rate is allowed anytime on the weekend.⁵⁶⁷ Daytime off-peak charging (8 am – 4 pm) costs 13.08 cents/kWh in the summer and 11.68 cents/kWh for the rest of the year.⁵⁶⁸ Dr. Santini notes that on-peak charging (4 pm – 9 pm) costs 41.44 cents/kWh.⁵⁶⁹

Second, Dr. Santini explains that Texas public utility, Austin Energy, supports installation of submeters to monitor hourly charging and included a significant penalty for afternoon on-peak charging.⁵⁷⁰ Dr. Santini explains that Level 2 charging is actively promoted and subsidized because of the assumption that high-speed charging will be desired by plug-in vehicle owners.⁵⁷¹ Dr. Santini states that Austin Energy includes a flat demand charge of \$30/month for EVSE with 10 kW or less, and \$50/month for more than 10 kW.⁵⁷² Plug-in hybrid vehicle owners also enjoy free public charging.⁵⁷³ This program

⁵⁶⁵ Santini Initial Comments at 10.

⁵⁶⁶ Id.

⁵⁶⁷ Id.

⁵⁶⁸ Id.

⁵⁶⁹ Id.

⁵⁷⁰ Id.

⁵⁷¹ Id.

⁵⁷² Id.

⁵⁷³ Id.

has been limited to 100 customers, and Dr. Santini states that Austin Energy and other utilities should determine ways to offer “all-customer” programs.⁵⁷⁴

Next, Dr. Santini discusses New York’s Consolidated Edison Smart Charge program. In this program, a recording device installed on the vehicle monitors and meters the time and location of charging events.⁵⁷⁵ Dr. Santini states that if EV owners charge in New York between midnight and 8 am, a rebate of \$0.05/kWh is provided to the vehicle owner at the end of the year.⁵⁷⁶ The program also has a demand charge incentive, as opposed to a penalty, of \$20/month for not charging between 2 pm to 6 pm on weekdays from June through September.⁵⁷⁷

Lastly, Dr. Santini discusses Xcel Energy of Minnesota’s pilot program, which is open to 100 participants. Dr. Santini explains that the program offers no subsidies for installation of equipment but offers off-peak rates to plug-in vehicle customers.⁵⁷⁸ In order to obtain the exclusive rate, customers must install a separate electrical meter and pay \$4.95 per month.⁵⁷⁹ Dr. Santini states that the off-peak rate is available nearly all night (9 pm – 9 am), saving customers about \$8.60 per month if they consume 300 kWh per month.⁵⁸⁰

In comparing the different programs, Dr. Santini notes that choices by Dakota Electric, Xcel Energy, and Austin Energy to provide longer off-peak time windows suggest that even if Level 1 charging were limited to 8 amps and 1 kW, the usual daily driving needs of many households could be met electrically with everyday constrained overnight charging for vehicles used for normal workplace commuting.⁵⁸¹

Greenlots observes there is little consensus as to how best accelerate the market for electrified, advanced mobility.⁵⁸² According to Greenlots, adherence to an inflexible program design or view of the market and participant roles would prevent a holistic

⁵⁷⁴ Santini Initial Comments at 10.

⁵⁷⁵ Id. at 11.

⁵⁷⁶ Id.

⁵⁷⁷ Id.

⁵⁷⁸ Id.

⁵⁷⁹ Id.

⁵⁸⁰ Id.

⁵⁸¹ Santini Initial Comments at 12.

⁵⁸² Greenlots Reply Comments at 8.

assessment of the virtues of different models and their associated costs and benefits. At the same time, simply creating or mandating different ownership structures does not mean that there will actually be competition within any given structure, or bring customer choice, says Greenlots. As several other stakeholders suggest, Greenlots agrees that a strong outcome of this process would be to resolve the lack of regulatory clarity that utilities and others have identified. Greenlots suggests that this could be accomplished by providing guidance and a flexible framework for utilities to engage in and embrace their inherently central role in transportation electrification.

Greenlots suggests looking to other jurisdictions where guiding principles and frameworks can provide guidance for similar Commission action.⁵⁸³ In Oregon and Washington, Greenlots states that utilities are afforded sufficient flexibility in exploring different avenues to support and accelerate the market, including utility ownership. In California, Greenlots notes that utilities are similarly afforded flexibility to propose direct investment in and ownership of EVSE. The California Public Utilities Commission (“CPUC”) ensures appropriate utility involvement by imposing a “balancing test” through which perceived competitive limitations between utility and private market investments are weighed against ratepayer benefits of utility ownership of EVSE. In all three states, Greenlots states that utility proposed pilot programs that involve some form of direct investment in EVSE have been approved.⁵⁸⁴ Greenlots suggests that principles developed by the Midcontinent Transportation Electrification Collaborative offer a useful set of best practices for utility engagement in accelerating transportation electrification, emphasizing the importance of a strong utility role.

In Greenlots’ view, the Washington Utilities and Transportation Commission’s (“UTC”) “Policy and Interpretive Statement Concerning Commission Regulation of Electric Vehicle Charging Services” released in June 2017 likely represents the best representative approach and set of guiding principles issued by a state regulator with respect to utility involvement in transportation electrification. The document laid out a broad framework under which utilities may propose programs:

⁵⁸³ Id.

⁵⁸⁴ Id. at 9.

“...it is appropriate to allow utilities to offer a range of EV charging services on a regulated basis, eligible for a standard authorized rate of return, provided that the infrastructure investments meet our traditional rate-making requirements ...we adopt a policy supporting a “portfolio approach” to electric vehicle charging services, similar to the approach used in utility conservation programs. Rather than a single “measure” or program offering, utilities should provide customers with multiple options for EV charging services, designed to serve a range of customer types, target multiple market segments, and evolve as technology changes. A program portfolio of EV charging service offerings will promote customer choice by allowing customers to choose among a portfolio of services meeting the criteria as outlined in this policy statement.”

According to Greenlots, the UTC Policy Statement prioritized a focus on market transformation, positing the premise that the utility role in the market may be able to diminish over time once a critical volume of vehicles are on the road. Greenlots believes market transformation to be at the heart of decision-making for encouraging utility investment and flexibility of role, including ownership. Put simply, Greenlots claims that market transformation is highly unlikely to occur within a reasonable amount of time without a significant role for the utility. Therefore, Greenlots states that limiting utilities’ ability to participate in the market translates directly to limiting the growth of the market and opportunities for all market participants. Greenlots states that when afforded flexibility, utilities become empowered to pilot and refine new ideas and offer a suite of options to customers, tailored to different situations and demands. This helps support utility development of an interoperable, integrated suite of smart-grid technologies that unlock value, not only on its own system, but also utilizing behind the meter assets. This customer-centric approach also is essential in securing customer buy-in and participation. When this occurs, Greenlots states that customers are then empowered to utilize grid resources in a way that best support dynamic grid demands and constraints while accounting for their own needs – providing benefits that flow to all ratepayers.⁵⁸⁵

⁵⁸⁵ Greenlots Reply Comments at 8.

Greenlots suggests that broader approaches exploring an array of different program designs and affording utilities sufficient flexibility will be key in realizing these significant benefits. Greenlots states that this regulatory strategy mirrors those used successfully with utility conservation programs in many parts of this country. Greenlots states that amid changing technology, such flexibility affords utilities the ability to offer different options for EV charging services, tailored for different customer types and market segments, ensuring and promoting customer choice. Indeed, Greenlots states that utility choice and optionality leads to the same for customers, which in turn provides both with the necessary tools to best support rapidly evolving grid needs and the integration of new technologies.

Generally, Tesla recommends utilizing the following five principles when evaluating initial utility program requirements or qualifications such as interoperability and standards: (1) Start from a place of universal understanding, including defining levels of interoperability and standards prior to considering if, how and when these may be utilized; (2) Include driver charging uses cases (i.e., home, workplace, fleet, corridor etc.); (3) Distinguish between public versus privately funded charging infrastructure; (4) Establish that customer experience, impact and choice are key elements of evaluating any program or pilot design requirements; and (5) Carefully evaluate the costs and benefits of any requirements that would apply across all charging stations.⁵⁸⁶

G. What kinds of building code considerations should be kept in mind?

ABB states that building codes should consider dedicated circuits, sufficient capacity, conduit and electrical panels, as well as sufficient dedicated parking accommodations.⁵⁸⁷

ATE explains that jurisdiction of building code issues are generally handled at city and local government level and sometimes through a statewide building council or similar

⁵⁸⁶ Tesla Reply Comments at 5.

⁵⁸⁷ ABB Initial Comments at 8.

organization. ATE supports EV-Ready Infrastructure adopted by the City Council as a good model for Illinois going forward.⁵⁸⁸

ChargePoint explains that “EV Ready” building code can vary by region, but typically requires new building construction to prepare a certain proportion of parking spots for EV charging to be installed at a later date, supporting sustainability goals and EV drivers.

ComEd believes that new state construction building codes that require or enable EV charging should be considered. Examples of construction building codes that have been proposed or adopted in other jurisdictions include requiring:⁵⁸⁹

- a 240-volt circuit or upgraded wiring or conduit for future installation in the garage or parking area for new residential construction;
- a conduit from the service panel to the parking area, with pre-wiring to allow charging to be installed in the future in a certain percentage of parking spaces for new multi-family construction; and
- a conduit from the service panel to the parking area, with pre-wiring to allow charging to be installed in the future in a certain percentage of parking spaces for commercial construction; for large parking areas require that there be some minimum number of actual charging units installed.

EVgo believes that building codes and local zoning can often pose challenges for EVSE deployment but can also provide opportunities. For example, minimum parking spot requirements for retail centers can limit site development for an EV charger if installing a public EV charging space counts against a parking lot’s minimum requirements. Instead, EVSE should be exempt, as parking is still able to take place while vehicles are charging.⁵⁹⁰

EVgo states that the ICC should consider how local zoning codes can either support or impede building out this critical piece of infrastructure. Additionally, the ICC should consider how minimum standards can be crafted to avoid favoring one charging

⁵⁸⁸ ATE Initial Comments at 14-15.

⁵⁸⁹ ComEd Initial Comments at 11.

⁵⁹⁰ EVgo Initial Comments at 2.

profile over another, such as by requiring minimum throughput rather than charger counts.⁵⁹¹

The Metropolitan Mayor's Caucus states that municipalities are very interested in becoming "EV Ready" by preparing policies and updating municipal codes to advance EVs and their supporting infrastructure, and the changing demands on the power grid and electricity markets.⁵⁹²

MMC states that municipalities have jurisdiction over zoning codes that can impede or accelerate adoption of clean energy technologies, like EVs and EV charging infrastructure. Municipalities are influential in building and electrical code adoption. Municipalities set and enforce permitting and inspection policies that regulate the installation of EV charging infrastructure.⁵⁹³

MMC states that they are considering a new 'EV Ready' program to empower municipalities to contribute to electrification of transportation in the region. The MMC has successfully led more local governments to earn designation as 'SolSmart' for transforming their solar codes and policies than in any other state. This experience informs their recommended strategies for local EV readiness.⁵⁹⁴

Tesla recommends that opportunities for EV readiness building codes for new construction at the state and federal level should be evaluated. Retrofitting parking structures is 4 to 8 times more expensive than outfitting new construction, with residents bearing the costs. At initial construction, EV charging infrastructure costs generally less than 1% of total building construction costs.⁵⁹⁵

⁵⁹¹ Id.

⁵⁹² MMC Initial Comments at 2.

⁵⁹³ Id.

⁵⁹⁴ Id.

⁵⁹⁵ Tesla Initial Comments at 14.

H. What kinds of ordinance changes can help encourage EV adoption?

ABB states that ordinances that support EV ready building codes and parking accommodations that make EV infrastructure inclusion easier for building and facilities managers are beneficial. In addition, ABB states that streamlining permitting and related civil works processes for EV infrastructure installations will alleviate project interruptions for all investing in EV infrastructure deployments.⁵⁹⁶

ATE believes interoperability and open standards are vital for greater EV adoption and improved consumer experience in the future as the scale of EVSE increases.⁵⁹⁷ ATE supports interoperability and open standards or protocols especially on the back end of network management systems that connect the cloud-based network to the specific charging station in the field. ATE asserts that Open Charge Point Protocol (“OCPP”) is the best available protocol in the market place today administered the by the Open Charge Alliance (“OCA”).⁵⁹⁸ In addition, ATE states that the interoperability of charging station systems on the front end need to be addressed quickly. ATE states that currently the charging experience for a new EV customer is too complex, fragmented, and burdensome for convenient charging at public facing stations. ATE observes that there are no national standards that allow free roaming among proprietary networks, and instead EV owners must sign up for several different charging systems with a membership card. Recently, ATE states that certain EVSE firms have negotiated peer-to-peer (“PTP”) agreements bilaterally for themselves to share information and this is a step in the right direction. Another option for an open platform is e-roaming an Open InterCharge Protocol (“OICP”). This concept should influence e-roaming among networks, billing compatibility, and ease of consumer use through development of common open platforms.⁵⁹⁹

⁵⁹⁶ ABB Initial Comments at 9.

⁵⁹⁷ ATE Initial Comments at 14.

⁵⁹⁸ Id. at 15.

⁵⁹⁹ Id. at 15.

Tesla states that local ordinances impact the rate and scale of charging infrastructure. A streamlined local development process for charging station development with permitting checklists without extensive review facilitates development. EV charging stations need to be figured into parking space requirements and not require additional parking spaces or take away from total parking counts. Policies that allow owners and renters to install charging stations is important.⁶⁰⁰

I. What other municipal codes can encourage EV adoption?

ABB cites to the U.S. Department of Energy for a compendium of recommendations for zoning, codes, and parking ordinances.⁶⁰¹

ComEd states that municipal codes and regulations that encourage EV adoption include, but are not limited to:

- parking ordinances that acknowledge and accommodate EVs and EVSEs;
- minimum EV space requirements for municipal and privately-owned lots/garages;
- allowing EVSEs to be installed on public roads and highways;
- time-limited parking to increase charging turnover;
- reduced or eliminated registration fees;
- high occupancy vehicle (“HOV”) lane access; and
- standardized, expedited permitting and inspection processes for new EVSEs.

Generally, MMC speaks to how municipalities can encourage EV adoption. MMC argues that municipalities operate a wide variety of vehicles in delivering vital services to their residents. From administrative to operational and emergency service vehicles, all municipalities operate these vehicles within community boundaries. Municipal leaders are interested in electrifying these vehicles for the environmental benefits and the direct health benefits to their constituents.⁶⁰² Electrifying ubiquitous public fleet vehicles have the added benefit of demonstrating EVs to the public in diverse communities across the

⁶⁰⁰ Tesla Initial Comments at 14.

⁶⁰¹ ABB Initial Comments at 9.

⁶⁰² MMC Initial Comments at 2.

state, including low-income regions where private EV adoption might be slow. Strategic electrification of municipal fleets would benefit from comprehensive analysis of municipal fleets to determine the most impactful and most viable segments of public fleets to transition to EVs.⁶⁰³

J. Describe technical standards, guidelines, and best practices to manage EV charging standards.

ABB lists that groups considered influential in EV charging infrastructure safety, interoperability, and best practices include National Electrical Manufacturers Association (“NEMA”), National Fire Protection Association (“NFPA”)/National Electric Code (“NEC”), International Electrotechnical Commission (“IEC”), International Organization for Standardization (“ISO”), Open Charge Alliance (“OCA”), Society of Automotive Engineers (“SAE”), Charging Interface Initiative e.V. (“CharIN”), and CHAdeMO Association.⁶⁰⁴

ComEd indicates that today, some technical standards have been developed while others are in progress. These standards govern charging speeds, charging connectors, safety requirements, interoperability and smart charging (including data management, exchange and access), amongst others.⁶⁰⁵

ComEd notes that the most widely adopted standard governing the installation of EV charging equipment is the National Electrical Code (“NEC”), specifically Article 625. NEC Article 625 concerns the wiring and equipment external to the EV that connects the vehicle to a supply of electricity for battery charging.⁶⁰⁶

Other standards include:⁶⁰⁷

- IEC 61851-1:2017, which applies to EV supply equipment for charging electric road vehicles, with a rated supply voltage up to 1 000 V AC or up to 1 500 V DC and a rated output voltage up to 1 000 V AC or up to 1 500 V DC; and
- IEC 61980-1:2015, which applies to the equipment for the wireless transfer of electric power from the supply network to electric road vehicles for purposes of

⁶⁰³ Id.

⁶⁰⁴ ABB Initial Comments at 9.

⁶⁰⁵ ComEd Initial Comments at 12.

⁶⁰⁶ ComEd Initial Comments at 12.

⁶⁰⁷ Id.

supplying electric energy to the RESS (Rechargeable energy storage system) and/or other on-board electrical systems in an operational state when connected to the supply network.

ComEd believes that a clear process for increased charging infrastructure could be beneficial to encourage EV adoption, thoughtfully plan for related charging infrastructure development, and also encourage lower carbon alternatives. The process should involve a variety of stakeholders, including, but not limited to, consumer advocates, municipalities, charging and vehicle manufacturers, and electric utilities.⁶⁰⁸

EVgo notes that as the ICC examines use cases for DC fast chargers, one example can be taken from CalEVIP, an incentive program run by the California Energy Commission. CalEVIP considers restaurants, retail centers, parking garages, gas stations, colleges/universities, city or government owned properties, and several more locations as eligible for participation in their grant program to install public charging infrastructure. All these locations can help enable access to EVs for those drivers without access to home charging.⁶⁰⁹

EVgo believes that successful deployments of EV infrastructure happen when utilities and charging companies plan together early and often, especially in capacity analysis. EVgo states that the ICC should ensure that utilities are staffed accordingly so that they have the means to respond quickly to requests for power availability, for example. A designated team working to streamline charger interconnections is crucial. The electric vehicle market is poised to soar, and utilities must be staffed accordingly to prepare for a surge in requests.⁶¹⁰

Tesla states that deployed charging equipment needs to meet safety standards such as certification by a Nationally Recognized Testing Lab. Program requirements should not be overly prescriptive at the nascent stage rather focus should be on scaling infrastructure deployment. Commission standards should be over billing, interoperability,

⁶⁰⁸ Id. at 1.

⁶⁰⁹ EVgo Initial Comments at 2.

⁶¹⁰ EVgo Initial Comments at 2.

communications, actual connector error, not over private companies' investments types or business and technology models of private companies on their side of the meter.

Tesla states that customer experience is impacted by location of charging, availability of numerous stalls, rate of charge, pricing, reliability, and equipment maintenance more than standards. No public utility commission in North America has adopted interoperability standards or a "single protocol" for charging stations.⁶¹¹

The UCS recommends that utility infrastructure programs require an open software protocol and interoperability with all major EV platforms.⁶¹²

Workhorse indicates that the designation of "no-idling" zones in municipal codes and ordinances will serve as strong encouragement for the adoption of EVs, especially electric delivery vehicles.⁶¹³ Workhorse explains that emissions from idling delivery vehicles are a significant cause of emissions in urban areas and since EVs do not "idle" when stopping to deliver packages, local codes and ordinances could explicitly recognize that they are permitted to make deliveries in "no-idle" zones.⁶¹⁴

In their Reply Comments, ChargePoint strongly supports "Open Access" requirements for all publicly-available EVSE and utilizing open standards in EV charging network services, like Open ADR to facilitate utility load management and network peer-to-peer roaming to allow EV drivers to use an app or RFID card on one charging network to access charging stations on another network.⁶¹⁵

According to Greenlots, open standards and interoperability is a critical detail for the Commission to consider as it considers transportation electrification generally, and as it reviews utility filings going forward.⁶¹⁶ Greenlots observes that many stakeholders illustrated in their Initial Comments that many of the chargers deployed today operate on

⁶¹¹ Tesla Initial Comments at 15.

⁶¹² UCS Initial Comments at 6.

⁶¹³ Workhorse Initial Comments at 2.

⁶¹⁴ Id.

⁶¹⁵ ChargePoint Reply Comments at 9.

⁶¹⁶ Greenlots Reply Comments at 7.

proprietary networks and software, the implications of which become increasingly dire to ratepayers and the public as more and more infrastructure is deployed.

According to Greenlots, proprietary networks unjustifiably risk that ratepayer or taxpayer-funded infrastructure investments can become stranded assets that do not meet evolving needs, and that vendor lock in results in higher operating costs, all while stifling innovation and competition across both charging hardware and software. Greenlots suggests that it is entirely within the purview and authority of the Commission to mandate open-standards based investments in allocating public funds.⁶¹⁷ Greenlots says that utilities, policymakers, manufacturers and developers should fully embrace open standards such as Open Charge Point Protocol (“OCPP”) and OpenADR to avoid these outcomes and best serve EV drivers, ratepayers and the evolving market, while acknowledging that vehicle manufacturer infrastructure strategy may differ. Greenlots contends that the adoption of open protocols and standards is essential to support transportation electrification, grow the market for EVs and EV charging products and services, enhance the driver/customer experience, integrate with the electricity system, and lower the cost of ownership of both EVs and EV charging infrastructure. Greenlots indicates that the proliferation of open standards and communication methodologies provides a platform and ecosystem for innovation and customer choice that is critical to guarding against stranded assets and protecting the prudence of ratepayer investments. Greenlots indicates that while open standards and communication methodologies are key elements of facilitating grid services and integration, infrastructure ownership and/or management structures are also critical contingencies for maximizing grid integration and beneficial load shape.

⁶¹⁷ Id. at 8.

Ratemaking:

- A. Describe whether utilities should charge time-varying rates, such as time-of-use rates, to incentivize EV penetration in the state. Explain why or why not.

ABB states that time-varying or EV charging rates would benefit EV drivers by allowing them to take advantage of lower rates.⁶¹⁸

Ameren notes that use of time-varying rates may produce benefits to EV owners, utilities, and non-participants.⁶¹⁹ Ameren notes that according to EPRI, at a 12.5¢/kWh average electricity price, fueling a vehicle is roughly equivalent to paying for \$1/gallon gasoline. With time-varying rates, off-peak pricing will enable customers to realize even greater savings. Ameren Illinois currently offers time-variant power supply rates under its hourly pricing tariffs: Rider RTP - Real Time Pricing, Rider PSP - Power Smart Pricing, and Rider HSS - Hourly Supply Service. Rider PSP is available to residential customers and is administered through a third party. Ameren notes that over the past year, average hourly prices from 4 p.m. through 7 p.m. were double the prices available from 11 p.m. through 5 a.m. Customers choosing to charge from late evening through early morning, instead of immediately after returning from work or daily chores, would have saved the equivalent of about \$0.16/gallon.

Ameren claims that encouraging off-peak charging also promotes more efficient utilization of the power grid.⁶²⁰ Ameren notes that utility delivery infrastructure consists of poles, wires, transformers, and other assets that must stand ready to serve peak usage demanded by customers, regardless of when it may occur. Ameren observes that increased peak usage demands commonly drive the need for reinforced grid infrastructure. Ameren notes that incremental usage redirected toward off-peak periods will have a minimal impact on changing overall system costs, all else being equal. Ameren argues that encouraging vehicle charging during off-peak periods will, therefore likely have a beneficial impact on all customers. Ameren notes that EV-owning customers will

⁶¹⁸ ABB Initial Comments at 9.

⁶¹⁹ Ameren Initial Comments at 19.

⁶²⁰ Ameren Initial Comments at 19.

pay rates that provide a contribution toward the utility revenue requirement, yet utility costs may not increase in the same proportion. Ameren states that this revenue/cost dynamic will be reflected in the utility ratemaking process, resulting in rates lower than they otherwise would be for all customers in the class.

Ameren submits that toward this end, utilities could offer time-variant distribution delivery prices.⁶²¹ Ameren indicates that such pricing would be higher during the most likely peak times of the day, and lower during off-peak times, all in an attempt to encourage usage, especially EV usage, to shift to less expensive off-peak periods. Ameren notes that present residential and small non-residential delivery service pricing is a flat rate applicable during usage in all hours of the day. A 1.0 to 2.0 ¢/kWh differential in delivery prices provides a gasoline cost equivalent differential of \$0.08 to \$0.16 per gallon. Ameren states that paired with hourly pricing, customers could save up to \$0.32 per gallon equivalent. Ameren's anecdotal observation is that retail gasoline customers will sometimes go out of their way to save a few pennies per gallon, and an electric rate structure designed to save them the equivalent of over \$0.30 per gallon might be attractive enough to drive adoption of time-variant rates.

Ameren also recognizes that some customers may not desire to place their entire household on time-variant rates.⁶²² However, Ameren states that customers may be interested in placing only their EV loads on the off-peak rate. Ameren observes that such end-use rates have been somewhat difficult to implement, in part because the end use needs to be metered or otherwise estimated. Ameren points out that additional metering would likely be cost prohibitive. Ameren notes that technology appears to be emerging that would allow reasonable estimation of usage by each appliance within the premises. Ameren indicates that utility-grade metering would still measure usage at the premises, but pricing of the usage could be split between "normal" use and EV use. Customers

⁶²¹ Id. at 20.

⁶²² Ameren Initial Comments at 20.

could then choose to place their EV use on a time-variant rate while retaining non-time-variant pricing for the rest of the premises.

Ameren asserts that utilities should explore time-of-use rates that effectively influence customer behavior, without harming non-participants.⁶²³ Ameren suggests that utilities should explore time-variant rate options for major aspects of the customer bill (delivery service, power supply) in order to most effectively incentivize customers. To the extent possible, Ameren states that utilities should utilize existing metering technology or require minimal incremental metering technology investment aside from standard metering service.

ATE argues generally, that ratemaking issues should be addressed in specific utility filings, and utilities are best prepared to develop such tariffs and programs for review by the Commission, depending on their medium and long-term planning for deployments and capital asset managements including EVSE and other DER's.

Dynamic rates are a good tool for providing incentives to consumers to move EVSE load to an off-peak hour. This is especially true in Illinois, where the northern part of the state can participate in real-time energy markets (with PJM) and garner benefits from time variations in pricing. But generally, in RTO states, it is easier to develop TOU rates and make them effective and provide discrete benefits to consumers.⁶²⁴

ATE believes that capital for investment for EVSE should be treated in similar manner as any other prudently incurred investments for capital in the distribution grid infrastructure. Expenses for education and outreach should be regarded as O&M expenses, while investments in make-ready to the meter or EVSE location (electrical wiring and any upgrades, trenching expenses to that location etc.) should be regarded as a capital expense, along with any associated equipment with communication devices (e.g.

⁶²³ Id. at 21.

⁶²⁴ ATE Initial Comments at 16.

commercial Wi-Fi networks in a mesh network that carry signals from the DCFC station to the equipment on the utility pole).⁶²⁵

ChargePoint states that TOU rates are valuable mechanisms to incentivize EV charging to take place at times that are beneficial to the grid, especially for home charging. Whole-house as well as EV specific TOU rates are proven offerings that can encourage customers to modify their charging behavior to align towards time periods that are more efficient and cost effective for the grid.⁶²⁶

CUB/EDF argues that at a minimum, utilities should offer and promote dynamic or time variant rates, including a TOU rate, to EV owners.⁶²⁷ Strong consideration should be given to a default dynamic or time variant rate for EVs. Utilities could condition financial incentives for the purchase of EVs and associated equipment on enrollment in these types of rates.⁶²⁸

Elevate Energy notes variable electric rates are an important component of widespread EV adoption, as they incentivize EV and PHEV owners to charge at specific times.⁶²⁹

EVgo states that forward-thinking tariff structures are needed to ensure fueling costs are competitive with internal combustion engine vehicles. Current commercial rate structures were not designed with electric vehicles' unique load profiles. Even though electricity costs are only a part of the puzzle -- around 30-40% of operating costs at the least, and sometimes up to 80% -- a high demand charge tariff often means the difference between a certain site being viable or non-viable for charging infrastructure.⁶³⁰

EVgo recommends that the ICC look to precedents being set and work underway in Washington, New York, and California on this critical piece of the EV puzzle.⁶³¹

⁶²⁵ Id. at 16.

⁶²⁶ ChargePoint Initial Comments at 20.

⁶²⁷ CUB/EDF Initial Comments at 4.

⁶²⁸ Id.

⁶²⁹ Elevate Energy Initial Comments at 1.

⁶³⁰ EVgo Initial Comments at 2.

⁶³¹ Id.

IIEC states that the ICC should generally set rates that best represent the cost of providing regulated utility services. They also believe that if rates are properly set, it is generally unnecessary and inappropriate for changes in rate structures to be made for incentivizing one use of electricity (such as charging EVs).⁶³²

Dr. Santini notes that regulatory practice separates demand charges from consumption charges, where demand charges are fixed charges independent of kWh that are intended to defray costs of consumption of capacity and consumption charges (\$/kWh) are intended to cover variable costs of operation.⁶³³ Dr. Santini recommends that policy intended to support renewable energy should focus on the use of demand charges, rather than operations charges, like \$/kWh.⁶³⁴

Sierra Club and NRDC recommend the Commission review current utility rates for compatibility with transportation electrification use cases and where rates are not optimized to support transportation electrification, lead or develop new rates. Core issues include time-variant electricity rates for Level 2 charging of conventional EVs at long-dwell time locations, (home) and demand charges in context of Direct Current Fast Charging and medium- and heavy-duty electrification.⁶³⁵

Sierra Club and NRDC state that time-variant rates (simple time-of-use rates or ComEd's hourly pricing) are an effective form of foundational load management that can ensure EVs do not strain the grid, but improve grid utilization by shifting load to off-peak hours. Furthermore, Sierra Club and NRDC suggest there is no need for additional pilots to test this proposition, lessons from TOU rates should be incorporated into rate design going forward.⁶³⁶ Both "EV-only" TOU rates utilize a separate or sub-meter, and "whole-home" TOU rates, where all electricity use is billed by the time-of-use on a single meter,

⁶³² IIEC Initial Comments at 1.

⁶³³ Santini Initial Comments at 12.

⁶³⁴ Id.

⁶³⁵ Sierra Club and NRDC Initial Comments at 17.

⁶³⁶ Id.

are viable options.⁶³⁷ Sierra Club and NRDC urge the Commission to evaluate both whole-home and separately metered time-variant rate options with a focus on cost-effectiveness and ease for EV drivers.⁶³⁸ Sierra Club and NRDC state that it is also important to note that time-variant electricity rates—particularly dynamic rates—may not be appropriate for all charging applications, or in all market segments. For example, in the case of public charging, the customer-of-record (i.e., the utility customer paying the energy costs) is not generally the end-user (i.e., the EV driver). Itinerant EV drivers cannot easily be armed with the tools needed to “set-and-forget” in response to dynamic price signals, nor will they necessarily have the flexibility to do so. Therefore, the initial focus in optimizing rates should be on long-dwell locations—like home charging (single family and multi-family) and the workplace.

Sierra Club and NRDC contend that demand charges can undermine the business case for high-power EV charging infrastructure investments to support light, medium, and heavy-duty vehicles, particularly where utilization is likely to be low in the near term. Rate design should be optimized for intended use cases, not subsidized. Demand charges often do a poor job of reflecting actual distribution costs, and because energy costs are better reflected in time-varying volumetric rates, reforming demand charges in general is good policy.⁶³⁹ Many demand charges over-collect by including non-facilities-related costs that should be collected in volumetric rates. Likewise, non-coincident demand charges are not generally cost-based. In addition, TOU rates with a sufficient on-peak to off-peak price ratio can send nearly the same price signal to reduce peak demand as a rate with a coincident demand charge, but without the complexity associated with charging for both kilowatt-hours and kilowatts. In contrast to purely volumetric rates, rates with demand charges can also frustrate the ability of a DCFC site-host to recover electricity costs from itinerant EV drivers because the site host cannot know what their ultimate bill will be until the end of a billing cycle and cannot therefore recover those costs in advance.

⁶³⁷ Id.

⁶³⁸ Id. at 18.

⁶³⁹ Sierra Club and NRDC Initial Comments at 18.

Tesla states that a good strategy is to explore voluntary TOU rates or programs that mimic TOU rates to provide customer choice, especially for residential customers. Providing a credit for the switch to the TOU rate is a way of providing a risk-free trial. TOU rates may be improved by reducing the length of the on-peak period so customers can more easily change behavior.⁶⁴⁰

UCS states that TOU rates offer significant grid benefits and refers to them as “no regrets” policies.⁶⁴¹ The UCS suggests that utilities should require TOU rates as a condition of program participation to ensure higher subscription.⁶⁴² The UCS notes that its suggestions apply to passenger cars, light trucks, and medium- and heavy-duty vehicles charging in the residential or commercial class.⁶⁴³

In their Reply Comments, ChargePoint agrees with Ameren Illinois to utilize a “rate limiter” to limit a customer’s demand charge to no more than a set cent/kWh value.⁶⁴⁴ ChargePoint suggests that the limit can be raised over time until it is no longer applicable after five or ten years.⁶⁴⁵

In Reply Comments, Greenlots observes that some Initial Comments suggest that because the significant majority of charging currently happens at home, if any action is to be taken, it should be limited to rate design related to charging in this specific context.⁶⁴⁶ While many early adopters with single family homes will have a dedicated garage and access to home charging, Greenlots claims that this will not be the case for the broader market. Greenlots says that this is not a situation where looking at the present is a good indicator of what we will see in the future. According to Greenlots, access to charging outside of this specific context will be key in both accelerating transportation electrification, and in providing equitable access to it.

⁶⁴⁰ Tesla Initial Comments at 16.

⁶⁴¹ UCS Initial Comments at 6.

⁶⁴² Id.

⁶⁴³ UCS Initial Comments at 6-7.

⁶⁴⁴ ChargePoint Reply Comments at 3.

⁶⁴⁵ Id.

⁶⁴⁶ Greenlots Reply Comments at 2.

Greenlots observes that in Initial Comments several stakeholders astutely zeroed-in on the importance of leveraging technology to maximize the benefits of transportation electrification to all ratepayers.⁶⁴⁷ Greenlots strongly agrees with these sentiments. Indeed, Greenlots suggests that the development of rates and programs that send or represent accurate price signals to EV loads reflecting local or grid constraints and realities is essential to align the increased electrification of the transportation system with the interests of the utility system and the broader public. Greenlots indicates that EV TOU rates represent a rather blunt but, in some cases, appropriate beginning instrument to deliver these price signals, especially at low levels of EV market penetration. Other strategies, Greenlots suggests, including managed or smart charging and real-time or dynamic pricing, represent more accurate instruments that can better utilize and dispatch flexible EV loads at charging stations with longer dwell times, such as residences and workplaces, to better maximize system-wide benefits and cost reductions. Greenlots suggests that other dynamic pricing instruments can also be deployed in higher power charging and shorter dwell time contexts, including DCFC. For these reasons, Greenlots encourages the Commission to look beyond TOU rate design and towards technology-facilitated smart/managed charging programs from the outset.

Greenlots emphasizes that the underlying key in providing these benefits and unlocking this value, in addition to technology, is a central utility role.⁶⁴⁸ Advanced rate design or technology driven alternatives require advanced technology and communication norms to allow consumers to respond to TOU or more dynamic price signals. Similarly, Greenlots notes that to implement managed charging, allowing utilities to actively manage the charging of EVs in response to real-time grid demands or constraints, requires appropriate software and hardware to make this both seamless for customers and the utility to implement. Greenlots suggests that managed charging programs then can provide grid services in the same way that demand response programs do but can be more impactful as they can also increase load. According to Greenlots, this capability of both load increase and decrease is an extremely powerful

⁶⁴⁷ Id. at 6.

⁶⁴⁸ Greenlots Reply Comments at 6.

tool in helping to manage and maximize the efficiency of utilization of grid assets and deliver value to all utility customers.

According to Greenlots, technology is also key to unlocking baseline power levels and corresponding charging speeds needed for resource sizing to shift or manage EV loads, and to do so with meaningful impact.⁶⁴⁹ Additionally, and especially in the residential market, Greenlots notes that smart networked chargers are critical to help enable consumers to be able to respond to advanced rates and charging programs utilizing pre-defined, but potentially evolving and reconfigurable hands-off “set it and forget it” preferences. According to Greenlots, what is key to understand here is that EV-specific rates and programs governing a single load managed with technology does not require active customer involvement to respond to price signals, as the technology embedded within the charger and network software handles this actively on behalf of the customer or site host. Greenlots suggests that this reality not only makes traditional arguments against advanced rate structures inapplicable, but it also makes it practical and warranted to move to advanced rates and rate alternative technology-driven programs leveraging the capabilities of the underlying technology at the outset and in an ongoing manner. According to Greenlots, looking not too far down the road, and recognizing the value provided by technological solutions already being deployed in EV charging hardware and software today, it is easy to see a future where the needs addressed and values historically provided by rate design are instead provided by these technological solutions in a far more effective manner. Greenlots states that indeed, managed charging programs are not limited to complementing rate design but can instead go further and be a more effective alternative strategic solution for maximizing outcomes. For these reasons, Greenlots believes that any program utilizing ratepayer or taxpayer funds should be required to utilize smart, networked EV chargers capable of unlocking these benefits. According to Greenlots, such EVSE can and should also be used to obviate the need for separate utility metering, delivering further cost savings to program participants and general classes of ratepayers. Regardless of the rate design tools and

⁶⁴⁹ Id. at 7.

programs utilized, for them to be most effective in creating system-wide benefits, Greenlots argues that deep and flexible utility involvement is key, both with the EV charging hardware and software facilitating these rates and programs, and in the rate and program development.

IIEC states that beyond allowing some rate modifications that, by better reflecting the utilities' cost of service may have the ancillary effect of making electricity for EV charging more economical, the ICC's role in the development of the EV market is highly limited at this time.⁶⁵⁰ As mentioned by one of the commenters, the ICC should not seek to choose winners and losers, i.e., one transportation technology, EVs, over others. IIEC argues, nor should it allow monopoly electric delivery utilities to unfairly engage in provision of services that are not utility delivery services, when there are already several competitive providers of EV charging equipment, and undoubtedly will be more as demand requires.

IIEC notes that most commenters addressing the ratemaking section suggest that time differentiated rates will help the EV market to develop, under the assumption that charging will occur primarily at times when energy prices are lowest.⁶⁵¹ As both Ameren (Ameren Initial Comments at 19) and ComEd (ComEd Initial Comments at 12) point out, all customers currently have access to time differentiated supply rates from the utility. IIEC observes that customers' election to take service under these rates is limited at this time. IIEC supports expansion of time differentiated supply rates for those customers who receive utility supply, as these rates, when designed properly, are more efficient and more cost-based. For customers who receive supply from Alternative Retail Electric Suppliers ("ARES"), i.e., other than from the utility, the IIEC contends that the ICC has no role in setting such rate structures, beyond its limited regulatory authority over ARES under existing law.⁶⁵²

IIEC observes that some commenters have suggested that delivery rates should be cost based as well.⁶⁵³ IIEC has been involved in every delivery service rate case

⁶⁵⁰ IIEC Reply Comments at 1.

⁶⁵¹ Id. at 3.

⁶⁵² Id. at 4.

⁶⁵³ Id.

proceeding of Ameren and ComEd and has yet to observe a grid-wide temporal difference in the cost of delivery services. IIEC believes this is because delivery service costs are largely fixed and thus generally do not vary with changes in electrical load on the conductors. IIEC would disagree in principle with suggestions, such as by Ameren (Ameren Initial Comments at 20), that artificial distinctions in delivery service pricing should be adopted, which may not be cost based, for the sole purpose of encouraging shifts in usage. For demand-based customers, IIEC observes that there is already a rate incentive to focus incremental usage to off-peak periods. IIEC generally agrees with the Attorney General's initial comments (AG Initial Comments at 4) where it is stated, "if a change in distribution rates is considered to reflect the demand associated with EVs, the Commission should require hard data linking EVs to changes in demand and in peak load."

IIEC observes that some commenters address the issue of customers being able to segregate their EV loads from the remainder of their facility/house loads for rate purposes.⁶⁵⁴ IIEC does not oppose such treatment, provided that costs associated with additional equipment, if any, are borne by the customers electing EVs. However, IIEC observes that if rates are cost based, the need to segregate the loads is less clear.

IIEC observes that parties generally agree that utility incremental investments in delivery service assets should be allowed in rate base.⁶⁵⁵ IIEC does not disagree but points out that only prudent and used and useful investments associated with delivery services are allowed in rate base. Enhancements to the utility distribution system may well qualify. IIEC argues that investments in competitive services, such as charging stations, would need to be proven to be associated with, and used and useful in, providing delivery services in order to be included in rate base. IIEC currently sees no evidence that this would be the case.

⁶⁵⁴ IIEC Reply Comments at 4.

⁶⁵⁵ Id.

Tesla observes that many stakeholders including ABB, ChargePoint, AEE, EVgo, ComEd, Sierra Club and NRDC, UCS, ATE, CUB/EDF reference the negative impact demand charges have on DCFC deployment. EVgo notes, “current commercial rate structures were not designed with electric vehicles unique load profiles.”⁶⁵⁶ ABB also states that “demand charges or tariffs are also a significant barrier to increased electrification as they make the business model for charging very difficult.” ChargePoint further “encourages the Commission to prioritize consideration for whether traditional, demand-based commercial rate structures are aligned with facilitating DCFC as the Illinois EV market grows.” Tesla, in both the Initial Comments and Reply Comments supports demand charge-free or reduced rates for commercial customers deploying both Level 2 and DCFC. Tesla further states the Commission should evaluate commercial charging rates and encourage the utilities to file applications to address issues on current rate design issues for DCFC given the numerous comments on rate design issues.⁶⁵⁷

a. How would EV drivers benefit from these rates?

ABB states that time-varying or EV charging rates would benefit EV drivers by allowing them to take advantage of lower rates.⁶⁵⁸

The AG states that while Illinois has been pursuing utility ratepayer funded energy efficiency programs, usage is not on a straight downward trend.⁶⁵⁹ Rather, the AG submits that usage varies year-by-year, depending on many factors, including weather. As the usage statistics from the ICC’s Electric Sales Reports show, in three of the last six years, total usage increased compared to the prior year, while three years’ usage decreased compared to the prior year. However, the AG explains the overall trend since 2011

⁶⁵⁶ Tesla Reply Comments at 3.

⁶⁵⁷ Id. at 4.

⁶⁵⁸ ABB Initial Comments at 9.

⁶⁵⁹ AG Initial Comments at 3.

appears to be declining usage. Future energy efficiency spending is intended to continue to reduce usage.

The AG notes that the rates of Illinois's two major utilities, ComEd and Ameren, are set based on an annual formula that incorporates annual changes in expenses, investment, and sales.⁶⁶⁰ As a result, the AG argues that their revenues are protected from the risks associated with a reduction in usage. However, the AG submits that because rates paid by consumers are affected by how much energy is used, a reduction in usage can increase the usage rate and an increase in usage can decrease the usage rate. Because EVs are a new source of energy usage, by increasing overall usage, usage rates can decrease because rate recovery is spread over more kilowatt-hours.

The AG indicates that today residential distribution rates are subject to regulatory review and are based on fixed monthly charges as well as usage or per kilowatt-hour charges.⁶⁶¹ Commercial distribution rates include a demand charge as well. The AG opines that the first question that must be clearly understood is whether there should be a change to distribution charges to reflect expected expanded demand from EVs. Today, no Illinois regulated electric utility has time-of-use distribution rates to reflect the effect of usage at different times of day on peak demand or cost. The AG argues that if a change in distribution rates is considered to reflect the demand associated with EVs, the Commission should require hard data linking EVs to changes in demand and in peak load. To the extent that this information supports a change in rate design, the AG claims that time-of-use rates to encourage off-peak usage and charging should be made available to customers with EVs, and to other customers who opt into the rate. The AG states that the interest in shifting usage to off-peak times is not limited to EV owners and a new time-of-use rate could help educate consumers about the costs associated with usage at different times of day.

The AG notes that unlike distribution service, supply service is unregulated and is ordinarily charged on a kilowatt-hour basis.⁶⁶² Illinois utilities provide supply to customers

⁶⁶⁰ AG Initial Comments at 4.

⁶⁶¹ Id.

⁶⁶² Id. at 5.

who can take advantage of hourly pricing or are “eligible” retail customers taking electricity service from the utility. According to the AG, in current market conditions, EV customers would benefit from hourly pricing that includes lower prices in the late night, early morning hours and relatively higher prices in midday. The AG indicates that Illinois already has a significant supply rate design option (hourly pricing) available to EV (and all other) customers that provides a price signal for when it is least costly to charge an EV. The AG suggests that the key is for EV owners to know about hourly rates and understand how hourly rates work.

The AG argues that to the extent that customers use unregulated alternative suppliers, the major problem facing the residential EV market is unreasonably high prices often charged by alternative suppliers.⁶⁶³ The AG asserts that there is no evidence that any alternative supplier offers a supply rate that incorporates the lower, off-peak energy charges available in the wholesale energy markets. To the extent that consumers lack access to lower prices at off-peak times, EV adoption will not be encouraged. Indeed, the AG argues that alternative supplier rates that are priced significantly higher than the utility rate will stifle adoption of EVs, as consumers fear prices that increase without explanation or notice. The AG suggests that consumers who choose EVs will need to have a deeper understanding of the cost of electric energy if they are to make rational choices that do not turn out to be unreasonably costly.

Ameren states that if TOU rates are properly designed, EV drivers could benefit from lower overall energy cost.⁶⁶⁴

ComEd believes that utilities should offer time varying rates to encourage off-peak charging. Off-peak supply is often lower in cost, and if customers are on demand-based rates, delivery costs could be minimal for EV charging. For example, EV drivers who

⁶⁶³ AG Initial Comments at 5.

⁶⁶⁴ Ameren Initial Comments at 21.

charge off-peak and take advantage of ComEd's hourly pricing program (i.e., Rider RRTP) save substantial supply costs due to the lower off-peak energy prices.⁶⁶⁵

CUB/EDF argue that by enabling EV owners to lower their rates through cost-effective charging practices, dynamic rates lower the fueling cost of EVs and make them a more affordable long-term purchase. Moreover, peak load shaving lowers total system costs, benefitting every ratepayer, not just EV owners.⁶⁶⁶

However, CUB/EDF would be concerned if a utility offered EV owners special rates not available to other customers if doing so might shift additional costs to non-EV owners.⁶⁶⁷

CUB/EDF argues that if left unmanaged, the additional load expected from increased EV adoption could result in higher costs for customers, including those who do not own an EV, by raising peak load. Conversely, shifting EV charging load in response to dynamic price signals can shave peak load and drive costs down for all customers.⁶⁶⁸

Elevate Energy states that an hourly rate pricing program is good for EV owners who can charge their EVs or PHEVs during off-peak hours, which tend to be between 1 am and 5 am.⁶⁶⁹ The Smart Pricing program offers hourly rates between 1 am and 5 am at \$0.01975/kWh and an average hourly rate of \$0.01900/kWh between 1 am to 5 am.⁶⁷⁰

Elevate Energy states that EV owners could see additional benefits from an hourly rate pricing program if they can shift the use of other major electrical appliances to lower priced hours of the day too.⁶⁷¹

IIEC states that EV drivers would benefit from these rates because EV drivers would benefit from low or even subsidized rates at the times they are charging their EVs, however, IIEC appears to state that this simple answer may violate cost of service principles. IIEC states that it is important to distinguish between utility tariff rates for power supply versus rates for delivery service. Power supply time-of-use rates are common, and

⁶⁶⁵ ComEd Initial Comments at 12.

⁶⁶⁶ CUB/EDF Initial Comments at 4.

⁶⁶⁷ Id.

⁶⁶⁸ Id. at 5.

⁶⁶⁹ Elevate Energy Initial Comments at 4.

⁶⁷⁰ Id.

⁶⁷¹ Id.

widely available today in Illinois and elsewhere for residential customers. Delivery service time-of-use rates are less common, and not currently available through Illinois residential tariffs. The primary reason is that, unlike for power supply, delivery service costs are largely fixed, i.e., do not vary with customer usage, and there is no significant difference in the cost of providing delivery service across hours of the day or days of the year for much of a utility's delivery service costs. For the portion of a utilities' delivery service costs that do vary based on the local coincident peak demands on the individual distribution networks, if any, the timing of the local peaks can differ dramatically from one to another, making it very difficult to develop a cost-based time-of-use delivery rate for all customers.⁶⁷²

IIEC argues that a power supply time-of-use rate would be a cost-based rate design to bill customers for EV charging and other applicable usage, and if designed properly, could encourage efficient use of existing production and transmission capacity owned by the utilities.⁶⁷³

IIEC states that whether the TOU rate design would incentivize EV penetration in Illinois depends on many factors, including whether the economics of electricity as a fuel provide savings versus gasoline as a fuel, coupled with the accompanying costs of purchasing, owning, and operating an EV versus a gasoline-fueled car.⁶⁷⁴

IIEC argues that over the long-run, if EV penetration occurs under utility rates and/or rate designs that are not cost-based, significant subsidies between utility customers are likely to develop and cause a push-back against continued EV penetration in the service territory, until and unless tariff rates are redesigned to be cost-based.⁶⁷⁵

IIEC argues that for a delivery service time-of-use rate to be fully cost-based, the time periods would have to be aligned not with the utility's highest load periods, but rather with the individual local distribution networks', i.e. circuits', highest load periods, which

⁶⁷² IIEC Initial Comments at 1-2.

⁶⁷³ Id. at 2.

⁶⁷⁴ Id. at 3.

⁶⁷⁵ Id.

can vary from neighborhood to neighborhood. This likely would necessitate different time-of-use periods and prices for every local distribution network or circuit.⁶⁷⁶

On the other hand, IIEC also argues that delivery service rates to customers charging their EVs must also be cost-based to avoid subsidies between ratepayers and allow for long-term EV penetration. A cost-based delivery service rate includes a fixed monthly customer or service charge that fully recovers the allocated fixed cost of providing delivery service to each customer. Other demand or energy charges may be used under a cost-based rate to collect the cost of providing delivery service that varies with the local maximum load.⁶⁷⁷

IIEC also believes that neither the fixed monthly cost to provide delivery service to each neighborhood, nor the local maximum demand on the neighborhood distribution transformer will be reduced simply as a result of customers charging their newly-acquired EVs in their homes. If customers shift their existing load to time periods of lower distribution network utilization, i.e. circuit-level off peak periods, and do not add new EV load to high-utilization time periods, only then would a utility's distribution cost to serve potentially decline over time.⁶⁷⁸

Dr. Santini states that customers who limit charging during peak periods, specifically late afternoon during the summer and early evening during the rest of the year, should enjoy a lower cost per kWh of electricity purchases than average existing customers, even if rate reduction is small.⁶⁷⁹

Regarding new plug-in customers who meet load pattern requirements, Dr. Santini states that those who will commit to peak charging at 1 kW or less should not have to pay demand charges to support construction of new capacity.⁶⁸⁰ Dr. Santini lays out two ways in which this can be accomplished: First, using an existing circuit capable of charging

⁶⁷⁶ IIEC Initial Comments at 3.

⁶⁷⁷ Id.

⁶⁷⁸ Id.

⁶⁷⁹ Santini Initial Comments at 3.

⁶⁸⁰ Santini Initial Comments at 3.

overnight for twelve consecutive hours at 1 kW (120 V, 8 amps); and second, installing a new dedicated circuit and electric vehicle supply equipment that will allow charging at 1.4 kW or above with a separate meter allowing hourly measurements of the actual charging activity, with either curtailment of charging at peak or deterrence via a high penalty rate during peak periods.⁶⁸¹

Dr. Santini notes that regarding range efficiency, with a driving range of 27 to 42 miles per day, all electric vehicles are more efficient than plug-in hybrids, which could range from 14 to 35 miles per day of electric driving if charged with up to 11 kWh per night.⁶⁸²

In his Reply Comments, Dr. Santini quotes Bonbright in stating that a skillfully designed system of demand-based rate differentials would distribute the burden of paying for capacity costs among consumers of services rendered at different periods of time so that the company's load valleys would be raised and peaks would be lowered.⁶⁸³

In their Reply Comments, Sierra Club and NRDC state that well-designed rates are a key component of achieving transportation electrification benefits.⁶⁸⁴ They note that utility regulators in at least twenty-six states and the District of Columbia either have an approach or are in the process of reviewing and adopting approaches to address EV-grid integration.⁶⁸⁵

B. Discuss whether charging infrastructures should be included in the rate base if the charging infrastructure is owned by public utilities. Explain why or why not.

ABB indicates that it supports rate-basing strategies where smart implementation of rate design, managed charging, and charging maintenance can create longer term

⁶⁸¹ Id.

⁶⁸² Id. at 4.

⁶⁸³ Id. at 2.

⁶⁸⁴ Sierra Club and NRDC Reply Comments at 4.

⁶⁸⁵ Id.

savings for utilities and consumers.⁶⁸⁶ ABB notes that private entities should not be competitively disadvantaged.⁶⁸⁷

The AG submits that in order to assess the role of the utility in developing EV infrastructure, the Commission must do two things: First, it must assess its statutory authority, including whether the construction of EV charging stations is currently treated as a utility function.⁶⁸⁸ Second, the AG indicates that the Commission should investigate the extent of private, non-utility investment in EV infrastructure. The Illinois Public Utilities Act (“Act”) provides that persons or entities that install, maintain, or repair EV charging stations must obtain certain certifications from the Commission. 220 ILCS 5/16-128A(d). The Commission has adopted Part 469 to govern the installation, maintenance, or repair of electric vehicle charging stations. 83 Ill. Admin. Code 469. The statute and the rules apply to non-utility entities. The AG believes that there is no indication that utilities were expected to compete with these independent EV installers certified by the Commission.

The AG states that over their history, Illinois’s electric utilities have incorporated the introduction of a myriad of electricity-devouring appliances, from air conditioners to televisions to home computers to game consoles to mobile phones.⁶⁸⁹ The associated increased electricity usage has been treated as growth. As air conditioning use drove up summer peak, summer-winter rate designs were considered to reflect the increased peak-related costs associated with air conditioning use. The AG indicates that consideration of rate design to incent EV charging to off-peak times should reflect both the effect of EV charging on infrastructure costs and the premise that increased usage will benefit all customers on the system and can counteract the pressure that reduced usage might place on usage rates.

The AG argues that at the current penetration of EVs in Illinois (less than 1% of vehicles), Illinois utilities should not have difficulty incorporating the additional demand on the system.⁶⁹⁰ As demand grows, the AG states that the utilities can assess how EV

⁶⁸⁶ ABB Initial Comments at 9.

⁶⁸⁷ Id.

⁶⁸⁸ AG Initial Comments at 6.

⁶⁸⁹ Id.

⁶⁹⁰ AG Initial Comments at 6.

charging affects infrastructure needs and costs, and how it interacts with other consumer uses. The AG argues that today the extent of future EV charging is unknown and its effect on infrastructure cannot be the basis of either Commission policy or utility investment mandates.

The AG notes that many of the questions posed by the NOI concern the commercial development of transportation electrification and the utility's role.⁶⁹¹ In addition to falling outside the Commission's jurisdiction, the AG states that these questions are more naturally and economically addressed by the marketplace in response to consumer demand. In fact, the AG points out that the private marketplace is responding to the need for EV charging infrastructure. Charging options include:

1. Home charging
2. Charging at businesses (free for employees or customers or at a charge)
3. Private charging sponsored by companies such as EVgo or ChargePoint
4. Municipal or other public entity charging stations (free, subsidized, or at a charge)
5. Parking lot charging (free, subsidized, or at a charge).

The AG states that these various charging models provide various benefits to consumers and businesses, depending on the model.⁶⁹² The AG points out that the risks and benefits to the installers are assessed by them, borne by them, and the decisions to proceed are non-utility decisions. Importantly, the AG points out that utility consumers are not asked to accept any risk associated with these investments.

The AG suggests that any utility role in EV charging stations must be considered against both the legal limitations on distribution utilities to provide delivery service and the inhibiting effect it could have on private investment. The AG argues that providing an EV charging station is a step beyond providing utility infrastructure to an electric meter, representing the point where the utility infrastructure ends and the customer's property

⁶⁹¹ Id. at 7.

⁶⁹² Id.

begins. The AG argues that a charging station is not a delivery service under the law, and therefore should not be a utility function.⁶⁹³ Further, the AG states that the lack of risk associated with annual formula rates place persons and entities that rely on private capital to finance charging stations at a serious competitive disadvantage. In addition to annually resetting rates to cover costs, formula rates include a guaranteed return on both projected and actual rate base as well as a retroactive charge if the prior year's guaranteed return and expenses were higher than expected. No investor in private charging stations enjoys this type of cost recovery says the AG. See 220 ILCS 5/16-108.5(c) and (d). While private investors bear the risks that the placement of their charging stations is optional, that EV adoption will grow as expected, that their costs will be covered and their return will be adequate, the AG opines that the utility can be expected to include all EV charging station costs in rate base, where the billions of dollars of utility investment can mask or swallow inefficient EV charging station investment, increase the utility's revenue requirement, and, in turn, increase customer rates.

The AG indicates that utility investment is infrastructure, paid by all consumers with no investor risk, can squeeze out private capital that currently is innovative and based on investor risk.⁶⁹⁴ The AG states that as EV penetration increases, one can expect privately funded charging infrastructure to grow. The AG argues that the Commission and the State of Illinois should give the private sector a fair opportunity to provide EV market needs and not adopt policies that may discourage private sector charging stations and unnecessarily increase customer rates.

The AG states that the electric car market includes very high end, or expensive, cars. For example, a fully electric Tesla Model S sedan has a base price of \$74,000, while a Model X SUV can cost \$140,000 fully loaded.⁶⁹⁵ Other electric cars, such as a plug-in hybrid, can have much lower prices. Nevertheless, the AG indicates that reports state

⁶⁹³ AG Initial Comments at 8.

⁶⁹⁴ Id.

⁶⁹⁵ AG Initial Comments at 8.

that “the uncomfortable fact of America’s early EV adopters is that they skew wealthy. EVs are still more expensive than equivalent gas cars. A rich person can pay for that, install a charger in the garage and keep a second gas-powered car for road trips that exceed an EV’s range.”⁶⁹⁶

The AG states that utilities provide an essential service that must be universally available at affordable prices.⁶⁹⁷ Given the extremely low number of EVs, with electric-only cars accounting for only about 7,700 vehicles out of more than 10 million in the state, the AG argues that it is unreasonable to expect all electricity consumers to pay for EV charging infrastructure for the convenience of people who own only 0.07% of the registered vehicles in Illinois. The AG indicates that if utilities invest in an expansive network of EV charging to incent EV adoption, the result would be that all customers, including low-income and payment-challenged customers, pay for infrastructure that only the wealthier consumers will ever use, assuming that EV adoption grows. Given that the private sector has proven both able and innovative in providing EV charging service to those customers who want it, the AG argues that utilities should not be authorized to include EV charging investment in their rates. At this stage of EV adoption, the AG states that it is not reasonable or prudent for Illinois monopoly utilities to expect ratepayers to fund EV charging stations in rates.

Ameren claims that to the extent utilities make capital investments in charging infrastructure or incentives that serve public interest, those capital investments should be included in Rate Base.⁶⁹⁸

As ChargePoint has previously argued, there are multiple categories of investment related to the installation of EV charging infrastructure. Distribution service and line extensions on the utility’s side of the meter clearly could be included in the rate base. As mentioned in Question 4, ChargePoint believes that the answer to the question becomes

⁶⁹⁶ Id. at 9.

⁶⁹⁷ Id.

⁶⁹⁸ Ameren Initial Comments at 21.

more nuanced when considering investments in electrical and charging infrastructure on the customer's side of the meter.⁶⁹⁹

ChargePoint argues that it would be appropriate for investments in charging infrastructure that is owned by public utilities on the customer's side of the meter to be included in the rate base provided that the utility program is consistent with the following guiding principles:⁷⁰⁰ maintain customer choice, encourage innovation, and stimulate competition; leverage matching payments from site hosts, whenever possible; support site-host access and control over pricing; avoid island networks and ensure open access for EV drivers; support equitable access to electric transportation options; and encourage smart charging behavior to enable widespread grid benefits.⁷⁰¹

ComEd believes that charging infrastructure should be included in rate base if the charging infrastructure is owned by public utilities. Charging infrastructure is a long-lived asset. Capitalizing and including such costs in rate base are appropriate accounting treatments for these types of assets.⁷⁰²

Assuming the term charging infrastructure excludes the standard utility delivery network, including a utility-supplied-and-owned meter, IIEC argues that no component of the charging infrastructure should be owned by public utilities.⁷⁰³ EV charging equipment can be constructed and EV services can be provided by third parties other than the incumbent utilities. Given that this service is competitive in nature, there is little justification for allowing regulated utilities to build EV charging infrastructure and to include the cost of such infrastructure in regulated delivery service rates. If incumbent utilities want to compete in this space, their parent companies should do so at their own shareholder risk, through a competitive affiliate, not through the utility itself.⁷⁰⁴

⁶⁹⁹ ChargePoint Initial Comments at 20.

⁷⁰⁰ Id.

⁷⁰¹ Id. at 10.

⁷⁰² ComEd Initial Comments at 12.

⁷⁰³ IIEC Initial Comments at 3.

⁷⁰⁴ Id.

The Sierra Club and NRDC argue that utilities should be allowed to bring proposals forward to support vehicle electrification, and, where the Commission finds the proposals are in the public interest and satisfy other criteria established, should approve allowance for cost recovery.⁷⁰⁵

The Sierra Club and NRDC state that in the context of ratemaking and cost recovery for potential utility programs, they request the Commission to provide flexibility; utility transportation electrification programs can be a good proving ground for performance-based ratemaking.⁷⁰⁶ There is no consensus on what utility program model is best, different program solutions are needed for different infrastructure challenges.

Greenlots observes that some initial commenters suggest that utility involvement in charging infrastructure will inhibit private investment and be detrimental to the expansion of the EV charging market.⁷⁰⁷ As a private market provider of this technology and these services, Greenlots strongly disagrees with this conclusion and this characterization of the market as a whole. Additionally, Greenlots submits that the Commission and stakeholders should look to actual participants in this market for relevant market perspectives. Greenlots states that it is important to note that while there may be some differences in opinion in how utilities should participate in the market, not a single market participant or provider of these products and services submitted comments suggesting that utilities do not have an important role. According to Greenlots, the question is not one of if utilities should be involved, it is a question of how, and we see a critical and central role for utilities in transportation electrification.⁷⁰⁸

IIEC states that it perceives that some parties have the proper view of the Commission's responsibilities as the regulator of electric utility services and rates in Illinois, while other parties appear to desire an intervention by the ICC and the electric

⁷⁰⁵ Sierra Club and NRDC Initial Comments at 20.

⁷⁰⁶ Id.

⁷⁰⁷ Greenlots Reply Comments at 2.

⁷⁰⁸ Greenlots Reply Comments at 3.

utilities that it regulates, in the electric vehicle market, which far exceeds the ICC's statutory authority and utilities' proper role in the market.⁷⁰⁹

UCS addresses the AG's concern regarding the speculative nature of utility investments in EV charging infrastructure.⁷¹⁰ UCS agrees that any infrastructure investments should be done prudently to avoid obstruction of private investment and cross-subsidization of customers and to protect ratepayer interests. UCS expects that future proceedings on transportation electrification program proposals will appropriately treat these criteria rigorously. However, UCS believes that limiting action to only suit present EV adoption for fear of unintended negative consequences could itself result in unintended negative consequences.

UCS acknowledges that although EVs may constitute a relatively small fraction of total vehicle stock today, a number of important statistics indicate the increasing role of EVs in the future of transportation. With respect to just passenger cars and light trucks, UCS asserts that the Council of State Governments has created a series of charts that speak to the progress of EVs in recent years in terms of total number of EVs, market share, availability of EV models, battery costs, vehicle range, and charging infrastructure. When focusing on the trajectory of EV penetration in the vehicle fleet in recent years and the expected continuation of EV adoption, UCS states that the case in favor of proactive investments becomes clear. UCS notes that EV loads are beginning to increase, and proactive investments will help avoid any potential negative effects of unmanaged EV charging on grid costs and stability, as noted by the Commission in the Notice of Inquiry. Thus, UCS contends that it behooves the Commission and utilities to adopt a forward-thinking attitude in making investments in EV infrastructure that will facilitate proactive management and positive uses of EV charging load.⁷¹¹

⁷⁰⁹ IIEC Reply Comments at 1.

⁷¹⁰ UCS Reply Comments at 2.

⁷¹¹ UCS Reply Comments at 3.

UCS states that in addition to managing EV loads in a way that serves the ratepayer interest, utility investment at this early stage of EV adoption will have co-benefits including cultivating a comparative market for EV charging infrastructure, reducing greenhouse gas emissions, and improving health outcomes from reduced local air pollution.⁷¹²

UCS notes that the AG, API-IPC, and AFPI each raise the concern of wealth transfer that could occur if ratepayer funds are used to fund infrastructure programs for individual EV owners.⁷¹³ UCS acknowledges that regressive wealth transfer is an important aspect to consider when designing or considering approval for EV charging programs. But categorically prohibiting utility investments due to the possibility of wealth transfer ignores the potential for programs to actively support equity and ensure benefits of transportation electrification to underserved market segments, according to UCS. UCS notes that equity and impacts for low-income customers, as CUB and EDF point out, “should be afforded particular consideration.”

UCS states that one type of EV infrastructure program that supports equitable access to EV benefits are infrastructure programs for low- and moderate- income residential ratepayers who may purchase a used EV or finance their EV through driving for a rideshare. UCS states that these customers, particularly those in multi-unit dwellings, are underserved by the competitive market for charging infrastructure due to the split investment incentive between landlord and tenant. UCS states that as Sierra Club and NRDC note in their Initial Comments, “there is a particularly compelling case” for utility investment in infrastructure for multi-unit dwellings from an equity perspective. Utility investments could fill this critical gap in charging infrastructure that impedes EV adoption by this customer segment.⁷¹⁴

UCS notes that a second type of program that supports equitable access to EV benefits are programs for medium- and heavy-duty vehicles. UCS states that medium- and heavy-duty electrification programs have the potential to reduce unhealthy exposure

⁷¹² Id.

⁷¹³ Id.

⁷¹⁴ UCS Reply Comments at 4.

to air pollution in communities disproportionately impacted by truck and bus pollution (i.e., communities near freeways, ports, railyards, warehouses and other freight facilities). Within the medium- and heavy-duty EV segment, UCS observes that utility programs for school and transit buses are already being deployed as strategic early investments to meet equity goals as well as goals for EV services to the grid. UCS states that many other heavy-duty EV programs, such as investments to electrify ports and railyards and the trucks that service these facilities, would also have a strong environmental justice component and support the broader economy at the same time.⁷¹⁵

- a. Discuss whether charging infrastructures should be accounted for as capital expenses. Explain why or why not.

Ameren argues that charging infrastructure has a long useful life much like other utility infrastructure investments, and thus would be considered plant (capital).⁷¹⁶

The Sierra Club and NRDC state that generally, for ratemaking purposes, steel-in-the ground utility expenditures (e.g., meters, paneling, conduit, actual charging stations) should be treated as capital investments.⁷¹⁷

- b. Discuss whether charging infrastructures should be accounted for as operational expenses. Explain why or why not.

Ameren indicates that charging infrastructures should not be accounted for as operational expenses. Ameren states that when discussing infrastructure that serves long-term public interest, these expenditures should not be expensed.⁷¹⁸ Doing so, Ameren suggests, would result in greater rate volatility (and bill impacts) and not allow the utilities to earn a fair return on their investments.

⁷¹⁵ Id.

⁷¹⁶ Ameren Initial Comments at 21.

⁷¹⁷ Sierra Club and NRDC Initial Comments at 20.

⁷¹⁸ Ameren Initial Comments at 21.

IIEC states that there are examples of utility's designated EV tariff rates requiring a separately metered account specifically for EV charging. If in that instance, the utility supplies and owns the secondary EV meter for the customer, then that meter cost should be included in rate base as a capital expense. Additional EV meter costs should be allocated to cost-causers, which in this instance is the singular EV owner requiring the secondary meter.⁷¹⁹ IIEC states that even if a secondary meter is necessary, this could be provided by a third party. The Illinois utilities' tariffs already allow for competitive "Metering Service Providers."⁷²⁰

Therefore, IIEC argues that to the extent charging infrastructures require capital investment, they should not be accounted as operational expenses, in any event. This would be inappropriate and likely would violate generally accepted accounting principles.⁷²¹

The Sierra Club and NRDC state that generally, for ratemaking purposes, no-capital expenditures (e.g., program administration or education and outreach) should be treated as expenses.⁷²²

Tesla states that utilities play an important role in the adoption of EVs and deployment of charging infrastructure. Tesla believes utilities should be able to recover costs associated with EV programs as long as they are prudently incurred, and that utilities should also be encouraged to invest in EV programs. Tesla does not have a position regarding whether costs are included in rate base, capital expenses or operating expenses.⁷²³

⁷¹⁹ IIEC Initial Comments at 4.

⁷²⁰ Id.

⁷²¹ Id.

⁷²² Sierra Club and NRDC Initial Comments at 20.

⁷²³ Tesla Initial Comments at 16.

C. What rate designs have other utilities implemented to encourage EV adoption and how successful have they been?

While Ameren Illinois has not performed an exhaustive study, it points out that several California utilities offer time-of-use rates for EV charging.⁷²⁴ Ameren Illinois has not studied the isolated effect of these rates on adoption, but notes that California has one of the higher penetrations of EVs in the U.S.

Ameren submits that it appears public charging infrastructure may require Level 3 charging stations.⁷²⁵ Ameren notes that these facilities can charge a vehicle in a fraction of the time a home or common business-based Level 1 or Level 2 charging station can. Ameren observes that Level 3 stations require substantially more power, ranging from 50 kW up to 350 kW. The threshold for Ameren's demand-based delivery service charges is 150 kW. Ameren notes that if a station has a high demand, but relatively low energy consumption, the equivalent cost per kWh will be much greater than it is for the average customer in the class, and perhaps even greater than that for residential and small non-residential customers. Ameren states that a September 2018 report developed by Advanced Energy Economy described how some utilities are providing such customers the ability to phase-in to standard rates over a number of years. Ameren has used a "rate limiter" in the past during difficult transitions, where the average cost equivalent of a customer's demand charges were limited to no more than a set cents/kWh value. Ameren states that the limiter can be raised over time, perhaps increased in steady increments until it is no longer applicable after five or ten years.

ATE indicates that there are a number of rate options, some states have adopted some sort of dynamic pricing with TOU rate, either a whole-home TOU rate or EV-only TOU rate. Several utilities have been able to secure approval for tariffs that provide some sort of "demand charge mitigation or holiday" for customers that wish to deploy DCFC especially.⁷²⁶

⁷²⁴ Ameren Initial Comments at 21.

⁷²⁵ Id. at 22.

⁷²⁶ ATE Initial Comments at 17.

ComEd indicates that most rate design efforts developed to encourage EV adoption have been off-peak charging to (1) improve grid utilization and (2) reduce the cost to charge existing EVs. Given the limited number of EV drivers currently, it is difficult to gauge how successful those rate designs have been. Additionally, the presence of overlapping state mandates and programs in states, such as California, make it difficult to accurately measure the effectiveness of the programs.⁷²⁷

EVgo is supportive of rebates either at the utility or legislative level that would provide purchase incentives to interested EV buyers and would point again to California as an example, where incentive amounts are tiered based on income level. Additionally, robust EV infrastructure legislation has been introduced in New Jersey this legislative session that provides EV charging goals for the state as well as car rebates for battery electric vehicles.⁷²⁸

IIEC states that they are aware that some utilities in the country use EV-designated tariffs for service to customers that charge EVs in their homes. Some examples IIEC includes are Consumers Energy Company, DTE Energy Company, Pacific Gas and Electric Company, and Southern California Edison.⁷²⁹ IIEC argues that utilities may allow EV owners to remain on legacy non-time-of-use rates, and practically speaking may not be able to force all EV owners off their existing residential rates, given that some EVs can be charged, albeit slowly, via a standard 120-volt home outlet.⁷³⁰ However, utilities may encourage customers to register their EVs with the utility and promote switching to a power supply time-of-use rate, either for their total home electrical use or for their EV charging needs only, which could require installation of a secondary meter. IIEC notes that such options as upgraded service and time of use rates are currently available to residential customers in Illinois under the regulated utilities' existing tariffs.⁷³¹

⁷²⁷ ComEd Initial Comments at 13.

⁷²⁸ EVgo Initial Comments at 2.

⁷²⁹ IIEC Initial Comments at 4.

⁷³⁰ IIEC Initial Comments at 4.

⁷³¹ Id.

Dr. Santini states that pilot programs have demonstrated that installation costs of intercity fast charging is more expensive than local public charging, which is still more expensive than workplace charging installations.⁷³² The least costly charging installation are residential charging stations.⁷³³ Dr. Santini states that the cost difference is related to the vehicle dwell time at different locations; since it is presumed that consumers will demand a significant number of miles of service from each charge event regardless of time spent at the location, cost of installation increases at locations where electric vehicles are not expected to dwell long.⁷³⁴ Dr. Santini states that not only does installation cost increase from residential chargers to intercity fast charging, but the probability of charging off-peak increases as well.⁷³⁵ Finally, Dr. Santini notes that intercity fast charging, often referred to as DCFC, is most costly and least universally applicable to any plug-in vehicle, as it only applies to all-electric vehicles.⁷³⁶

The Sierra Club and NRDC provide examples of rate designs to address demand charge challenges for commercial customers providing charging for EVs.⁷³⁷ For example, Sierra Club and NRDC point out that Southern California Edison has newly approved commercial TOU rates designed for DCFC, and medium and heavy-duty fleet electrification, which will phase in demand charges over time as utilization improves. SCE's proposed rates cover a wide range of potential users, with one rate for customers with peak demand between 21 and 500 kW (TOU-EV-8) that would likely serve public DCFC station operators and smaller electrified fleets and another rate for customers with peak demand greater than 500 kW (TOU-EV-9). Sierra Club and NRDC also note that Pacific Power (Oregon) recently received approval from the Oregon Public Utility Commission for a special tariff (Schedule 45) rate that replaces a portion of demand charges with higher on-peak energy charges for a nine-year period. At the end of this nine-year period, DCFC station operators would return to Pacific Power's regular demand

⁷³² Santini Initial Comments at 4.

⁷³³ Id.

⁷³⁴ Id.

⁷³⁵ Id.

⁷³⁶ Id.

⁷³⁷ Sierra Club and NRDC Initial Comments at 19.

charge tariff. Energy charges would increase by \$0.107 per kWh in the first year of the program. This increased energy rate would fall by ten percent each year for nine years. Also in the first year, demand charges would be discounted by 90 percent, with the discount falling by ten percent in each subsequent year. DCFC operators are estimated to reduce electrical bills by up to 59 percent in the first year under this tariff. This special tariff is only available to DCFC station operators who provide charging to the public and have up to 1,000 kW of peak demand. Pacific Power's sister utility, NV Energy (Nevada) recently filed for approval of a similar rate before the Public Utilities Commission of Nevada.

Tesla advocates for demand-charge-free or reduced rates for commercial customers deploying both Level 2 and DCFC charging. When utilization of DCFC charging is low, demand charges may account for 90% of stations' monthly electricity bill, prohibitively high operating costs for commercial customers deploying Level 2 workplace or fleet charging. Three-part tariffs are ideal for long term rate design as charging stations utilization increases and operating costs are reduced by high peaks in demand. Currently, demand charge holidays or reduced rates over short -to -medium term periods and transition to longer-term rate design to mitigate high operating and development costs for Level 2 and DCFC.⁷³⁸ Tesla also provides the following chart of EV rate designs from other jurisdictions:

⁷³⁸ Tesla Initial Comments at 17.

Utility	Commercial EV Charging Rate Design
Southern California Edison, CA	Approved demand charge free rate for all non-residential charging load for a five-year period, followed by the phase-in of a modest demand charge over the following five years. Time-of-use (TOU) volumetric energy charges increased to recover costs previously recovered in the demand charge.
Eversource, CT	Approved demand charge free rate for all DCFC charging load with increase in volumetric energy charge to recover costs previously recovered in the demand charge. No limit on term of rate offering.
NV Energy (North and South territories), NV	Approved DCFC rate with a ten-year transitional demand charge (2019-2028).
Con Edison, NY	Approved economic development rate for DCFC, that includes a demand charge discount for seven years.
Pacific Power, OR	Approved rate beginning with a demand charge discount of 90%, phasing in at 10% per year until the demand charge is restored at 100%. Volumetric energy charges are adjusted to recover costs previously recovered in demand charges.
PECO, PA	Proposed five-year pilot rate in which the customer receives a fixed demand credit, initially equal to 50% of the combined maximum nameplate capacity rating for all DCFCs connected to the service to the customer's billed distribution demand. Pending final approval
National Grid, RI	Approved DCFC Discount Pilot that provides a distribution demand charge credit for three years.

Regulatory Treatment of EVs and Charging Stations:

A. Discuss whether EVs should be treated as distributed energy resources ("DERs") for regulatory purposes. Explain why or why not.

ATE believes that utility investment in these grid-edge capital assets should be treated in similar fashion to other assets. Many of the EVSE already include DR capabilities and distributed storage can be added as a complement or addition in the future, if proven to be useful and cost-effective.⁷³⁹

ChargePoint argues that EVs, in part or fully powered by electricity from the grid, along with the associated charging infrastructure, do not by themselves necessarily fall

⁷³⁹ ATE Initial Comments at 18.

under existing definition of DERs. Some electric vehicles and charging equipment have the capability to undertake load management functions and ensure the efficient use of energy.⁷⁴⁰ ChargePoint also explains that the electrification of vehicles is generally considered to be a more efficient form of transportation and there are certain charging technologies that are more efficient in the provision of fuel than others. However, the primary purpose of EVs and EVSE is to support the conveyance of drivers, riders, and goods between destinations. These critical transportation functions require separate consideration from DERs.⁷⁴¹

ChargePoint respectfully urges the Commission to explore the creation of a consistent, statewide framework to address the unique case of EVs and EV charging rather than apply existing DER transportation electrification technologies. ChargePoint explains that by so doing, Illinois would be in a position to accelerate the sustainable and scalable growth of its EV and EV charging markets while also creating a beneficial load for the grid.⁷⁴²

ComEd believes that given today's nascent technology and capabilities, EVs (i.e., batteries) are not generators, and therefore are not considered a DER.⁷⁴³

Sierra Club and NRDC state that the flexibility of EV charging means EVs may serve as DERs that benefit the grid. This potential is vehicle-grid integration, which can help achieve three complimentary goals: (1) improving integration of renewable generation, (2) reducing total cost of vehicle ownership, and (3) facilitating cost-effective grid management. The category of VGI immediately relevant is "managed charging," EV charging that is managed or adjusted based on grid conditions via communications with the grid operator.⁷⁴⁴ There is ample opportunity for benefits as these technologies scale. Leveraging the inherent, flexible storage capacity in the batteries of EVs that have already

⁷⁴⁰ ChargePoint Initial Comments at 20-21.

⁷⁴¹ Id. at 21.

⁷⁴² Id.

⁷⁴³ ComEd Initial Comments at 13.

⁷⁴⁴ Sierra Club and NRDC Initial Comments at 20.

been bought can improve load shapes, integrate variable renewable energy resources, and generate substantial grid benefits.⁷⁴⁵ The Sierra Club and NRDC state that the Commission should explore how EVs can be leveraged to achieve Renewable Portfolio Standards.

Tesla recommends a determination not be made at this time but to continue monitoring the uptake of EVs and deployment of DER and tracking customer participation and preferences using their vehicles and EVSE as DER grid resources.⁷⁴⁶

IIEC states that it disagrees that EVs or charging stations should be deemed DER on the basis of battery back-up or battery storage capabilities, as the necessary vehicle-to-grid technologies are not yet fully developed or widely available in EVs.⁷⁴⁷ IIEC observes that some parties have raised the concept of allowing charging stations to participate in the utilities' demand response programs, and IIEC supports load enrolling in these types of cost-based programs that induce customers to shift load or curtail load during system peaks. IIEC notes that fast-charging stations may be best suited to participate in demand response programs.

Tesla notes, today creating customer price signals via TOU rates and encouraging or managing Level 2 charging where vehicles are parked for several hours at the right time(s) provides the most valuable grid benefits for integrating EVs. Furthermore, Tesla stresses a clear understanding is necessary of terms associated with VGI such as VG1 and VG2 before pilots can be discussed.⁷⁴⁸ Stakeholders see opportunities in VG1 and VG2 applications, but Tesla encourages making customer experience and value primary considerations in integrating EVs into the grid and advanced V2G should not be a primary focus.⁷⁴⁹

⁷⁴⁵ Id. at 21.

⁷⁴⁶ Tesla Initial Comments at 17.

⁷⁴⁷ IIEC Reply Comments at 4.

⁷⁴⁸ Tesla Reply Comments at 5.

⁷⁴⁹ Id.

- a. Discuss whether passenger cars, transportation vehicles, and corporate fleets should be treated equally. Should one type be favored over others? Explain why or why not.

ChargePoint argues that different EV charging load profiles present different value propositions to the grid. Passenger cars, transportation vehicles, and corporate fleets all have different EV charging load profiles. While one type of transportation should not be favored over another, some may be more suitable to serving as reliable DERs than others.⁷⁵⁰

Tesla states that transportation electrification will need to cover the entire ecosystem of transits, light, medium and heavy-duty vehicles. However, increasing access to light-duty vehicle chargers is critically important. Tesla recommends a holistic evaluation of electrification of transportation such as near-term emphasis on driving adoption of light-duty EVs to long-term needs of infrastructure needs of heavy duty trucks.⁷⁵¹

- b. How can unique demand response programs be structured for each customer classification?

ComEd states that given the nascent nature of the technology and the market, it is too early to define how a demand response program should be structured for the different customer classifications.⁷⁵²

Tesla states that EVs and charging stations can be tools utilized in demand response programs and should not be treated separately from other demand response mechanisms.⁷⁵³

⁷⁵⁰ ChargePoint Initial Comments at 21.

⁷⁵¹ Tesla Initial Comments at 18.

⁷⁵² ComEd Initial Comments at 13.

⁷⁵³ Tesla Initial Comments at 18.

B. Discuss how common charging stations should be categorized for regulatory and accounting purposes.

ComEd states that if the charging station is owned by the public utility, then it should be accounted for as a long-lived capital asset and included in the utility's rate base.⁷⁵⁴

IIEC states that pertaining to regulatory treatment of EVs and charging stations, IIEC supports the notion that development of charging stations is currently a competitive industry, and that Illinois legislation and Commission action should aim to allow it to flourish as a competitive industry.⁷⁵⁵ IIEC observes that some parties indicate that utilities should develop and own publicly available EV charging stations, for various reasons, including cheaper access to capital, or the grid knowledge to be able to better site public charging stations. However, IIEC agrees with the AG that the Commission must first determine whether, under existing statutory authority, the construction of either an in-home or a public charging station is treated as a utility function. IIEC states that proper consideration should be given to the competitive advantage that utilities would gain over competitive providers already operating in this space, if the utilities were given the authority to develop charging stations. Illinois electric utilities are a regulated monopoly, enjoy a guaranteed return on investment, and currently operate under a formula ratemaking structure. IIEC supports those commenters who believe private investment in charging stations should be maximized and encouraged, versus public investment by ratepayers via utility tariff rates.

⁷⁵⁴ ComEd Initial Comments at 13.

⁷⁵⁵ IIEC Reply Comments at 5.

C. Discuss how privately-owned charging stations should be categorized for regulatory purposes.

a. Should common charging stations and privately-owned charging stations enjoy the same regulatory and accounting treatment?

ComEd indicates that privately owned charging stations would not receive regulatory treatment. The owner would be subject to standard accounting practices.⁷⁵⁶

The Sierra Club and NRDC point out that the Illinois Public Utilities Act makes plain that entities that develop and operate EV charging stations through their own means- regardless of whether they are public or private stations- are not subject to regulation as a public utility. This is critical for enabling pricing of EV charging services by the kWh, which allows EV drivers and fleet operators to be charged for EV charging services in an easily understood unit of measurement. In the instance where the regulated utility is deploying or facilitating deployment of publicly-accessible or private EV charging stations, those stations would then be subject to Commission oversight.⁷⁵⁷ For example, if a regulated utility proposed to facilitate the deployment of EV charging stations in a filing before the Commission with utility customer funds, that proposal would be subject to Commission review and approval to ensure it was in the public interest and supported regulatory objectives. The Sierra Club and NRDC note that the Commission may wish to ensure price and load management signals encourage off-peak charging and clarify terms

⁷⁵⁶ ComEd Initial Comments at 14.

⁷⁵⁷ Sierra Club and NRDC Initial Comments at 21.

of charging station maintenance and upkeep to ensure charging stations are used and useful, as other public utilities commissions have done.⁷⁵⁸

D. Discuss what kinds of incentives could be implemented to encourage further EV penetration into the US markets.

The AG states that the NOI contains seven topics and multiple subtopics, raising detailed questions about the effect of EVs on Illinois and future policy options and “solutions.”⁷⁵⁹ The AG indicates that these questions cannot be answered today without engaging in extensive speculation. The AG suggests that a better approach is to recognize where Illinois is today, and address issues that are arising today, recognizing that circumstances might change and require different or new approaches. The AG argues that solutions based on speculation about what the future may bring can result in unintended and unexpected consequences, can obstruct or skew private, non-utility investment, and can result in improper subsidies of higher income EV owners by utility customers.

Ameren points out that Illinois utilities can play a significant role in accelerating EV penetration if regulators and stakeholders partner to develop effective market incentives.⁷⁶⁰ Ameren states that these could include:

- Adoption of cost-effective incentive structures that encourage deployment of charging infrastructure that is in the public interest
- Adoption of other forms of cost-effective incentives across the EV value chain
- Cost recovery for community-based EV marketing efforts, such as ride-and-drive events
- Cost recovery for utility consumer education efforts that effectively increase consumer adoption rates
- Cost recovery for programs which extend the benefits of EV technology to lower-income customers

⁷⁵⁸ Sierra Club and NRDC Initial Comments at 22.

⁷⁵⁹ AG Initial Comments at 2.

⁷⁶⁰ Ameren Initial Comments at 23.

•Cost recovery for staffing resources dedicated to developing and accelerating Illinois EV markets

Ameren asserts that the challenge is not just to attract customers to EVs, but also to create an attractive marketplace where manufacturers allocate a larger share of their EV capacity to Illinois.⁷⁶¹

Ameren opines that in all cases, EV programs should be designed to encourage entities other than utilities who stand to benefit from expanded EV markets to contribute their resources to effective market development.⁷⁶²

AFPI states that well-intentioned policies often fail to deliver the anticipated outcomes, partly because their enactment is the product of rent-seeking and government picking winners and losers, rather than addressing well-diagnosed public policy problems.⁷⁶³

AFPI cites a report from the Congressional Budget Office, which indicates that the Qualified Plug-in Electric Vehicle Tax Credit cost the federal government between \$230 to \$4,400 for every ton of carbon dioxide emissions that the subsidy reduces.⁷⁶⁴ AFPI states that these cost estimates are much higher and exceed the estimated value of avoiding carbon dioxide emissions by every governmental entity.⁷⁶⁵

API-IPC argues that energy policies in Illinois should provide for consumer choice and allow for a free market to determine the mix of energy sources required to meet societal needs.⁷⁶⁶ API-IPC goes on to argue that policies should not include subsidies meant to accelerate the adoption of EVs and the charging infrastructure necessary to support EV operation in Illinois.⁷⁶⁷ This includes incentives through tax credits, rebates, utility rate increases, and other financial incentives, as well as arbitrary target dates by

⁷⁶¹ Id.

⁷⁶² Id.

⁷⁶³ AFPI Initial Comments at 2.

⁷⁶⁴ Id.

⁷⁶⁵ Id.

⁷⁶⁶ API-IPC Revised Initial Comments at 1.

⁷⁶⁷ Id.

which certain amounts of sales are to be completed.⁷⁶⁸ API-IPC believes that policies should demonstrate an awareness of the time involved in making successful energy transitions at the societal level.⁷⁶⁹

Regarding manufacturers, API-IPC states that the California zero emission vehicle mandate, which was adopted by nine states, ends with model year 2018.⁷⁷⁰ This, API-IPC argues, should be sufficient incentive for manufacturers to offer increasing numbers of EVs for sale in ZEV states outside California.⁷⁷¹

API-IPC states that many incentive programs are not effective. For example, API-IPC notes that California spent \$449 million on vehicle rebates, which only led to 4.8% light-duty ZEV sales and about 1.2% of the cars on the road in California.⁷⁷² API-IPC states that Massachusetts, Maryland, and New York offered subsidies that only achieved ZEV sales of 1.3% and 1%, and 1% respectively.⁷⁷³

Lastly, API-IPC warns that subsidies for higher-income Americans are not fair to everyone else, as inevitable cuts will have to be made in other areas.⁷⁷⁴

The CACC notes that the National Association of State Energy Officials (“NASEO”)⁷⁷⁵ recently released their “PEV Policy Evaluation Rubric: A Methodology for Evaluating the Impact of State and Local Policies on Plug-In Electric Vehicle Adoption.” CACC states that NASEO and their partners developed this rubric based on extensive literature review to assist decision-makers to address many of the barriers experienced by the EV market. CACC states that without having to restate the numerous barriers and opportunities already identified in NASEO’s and numerous other reports, CACC recommends the ICC consult NASEO’s report and prioritize “strong” policies and

⁷⁶⁸ Id.

⁷⁶⁹ Id.

⁷⁷⁰ Id. at 2.

⁷⁷¹ Id.

⁷⁷² Id.

⁷⁷³ Id. at 2-3.

⁷⁷⁴ Id. at 3.

⁷⁷⁵ https://www.naseo.org/Data/Sites/1/pevpolicyrubricmethodology_naseo.pdf

programs

for

Illinois:

https://www.naseo.org/Data/Sites/1/pevpolicyrubricmethodology_naseo.pdf.

CACC suggests that a priority action could be forming a multi-state leadership consortium of Midwest Governors to help promote EVs, as was done by the Western Governors Association in 2017.⁷⁷⁶ CACC states that this coalition can be helpful to overcome barriers and leverage resources. Additionally it would send a signal to vehicle original equipment manufacturers, utilities and the EVSE industry that the Midwest is a prime EV market.

ComEd believes incentives that could be implemented to encourage EV adoption include, but are not limited to:⁷⁷⁷ local and state tax incentives for EVs and charging stations; rebates for EVs and charging stations provided by the state and/or the utility; access to HOV lanes; reduced vehicle registration fees; reduced permitting costs for EV infrastructure; and reduced/eliminated highway tolls.

ComEd states that to accelerate the adoption of EVs and to realize the potential benefits, incentives may be helpful to increase the availability of EV charging stations and associated infrastructure.⁷⁷⁸

The IMA states that it is important that manufacturers produce a variety of vehicles, including electric vehicles, so that consumers have choices.⁷⁷⁹ IMA has a long-held policy that state and federal policies and regulations should encourage competition rather than picking winners and losers.⁷⁸⁰ IMA believes that competition results in lower prices, consumer choices, and increased efficiency as we have seen since the advent of electric deregulation in Illinois 20 years ago.⁷⁸¹ IMA has concerns with any government mandated policy that would provide an unfair advantage to any particular vehicle.⁷⁸²

⁷⁷⁶ CACC Initial Comments at 2.

⁷⁷⁷ ComEd Initial Comments at 14.

⁷⁷⁸ Id. at 1.

⁷⁷⁹ IMA Initial Comments at 1.

⁷⁸⁰ Id.

⁷⁸¹ IMA Initial Comments at 1.

⁷⁸² Id.

Regarding how municipalities can contribute to growth of EVs, the MMC states that they can encourage the adoption of EVs in municipal fleets; and, adoption of local codes and implementation of policies that support access to EV charging infrastructure.⁷⁸³ Additionally, MMC states that under the Future Energy Jobs Act (“FEJA”), utilities can use funds collected from EV charging to incentivize energy efficiency and renewable energy measures. This can be in the form of rebates to EV owners who replace tires with tires that have low rolling resistance, or for customers who switch from internal ICE vehicles to EVs.

Tesla states that many studies have analyzed opportunities for increasing EV penetration in U.S. markets, including recent studies such as NASEO’s PEV Policy Evaluation Rubric and NREL’s Barriers to the Acceptance of PEVs.⁷⁸⁴

In Reply Comments, AFPI urges the Commission to embrace the principal of equal rights for all ratepayers and the free market is the fairest way to allocate resources. The existing regulatory environment for EV charging is preferential to widescale intervention and over time it will lead to the organic growth of what currently constitutes a niche market for high-income households. AFPI notes that the more than 679,000 households in Illinois experience an unaffordable energy burden is the real priority for the Commission over “range anxiety” for EV drivers. AFPI states that adding a myriad of new socially regressive subsidies in clear transgression of the equal rights of all ratepayers seems like a very unfitting policy choice for regulators entrusted with the public confidence. AFPI looks forward to seeing an open, thriving, just and reasonable electric vehicle market place in Illinois.⁷⁸⁵

In their Reply Comments, ChargePoint agrees with other stakeholders that the market needs to stay innovative and competitive to improve customer access to charging, charging network reliability, and an overall better user experience.⁷⁸⁶ ChargePoint notes

⁷⁸³ MMC Initial Comments at 1.

⁷⁸⁴ Tesla Initial Comments at 18.

⁷⁸⁵ AFPI Reply Comments at 4.

⁷⁸⁶ ChargePoint Reply Comments at 4.

that regulatory requirements could unintentionally restrict innovation and competition. For example, time-of-use rates that are exclusive to EVs can create widespread grid benefits without putting a customer's whole house energy usage on the hook, but EV-only time-of-use rates traditionally require installation of additional utility meters, which are expensive and depress enrollment in EV-only time-of-use rates.⁷⁸⁷

ChargePoint references Ameren and Siemens' notions that technology might allow customers to split their pricing between EV use and any other use.⁷⁸⁸ ChargePoint agrees with Ameren and Siemens that customers should have a choice of EV charging equipment and EV charging network services that provide the underlying features and interaction that customers desire.⁷⁸⁹

The Institute for Energy Research ("IER") argues that the best way for Illinois policymakers to promote the "optimal" speed of EV penetration is to promote competition and stable rules, so that the Illinois electricity market approximates a standard market as much as possible.⁷⁹⁰

IIEC believes it is premature at this time to burden ratepayers with cost recovery of EV incentive payments without a proper cost-benefit analysis being conducted to support the incentive programs.⁷⁹¹

In his Reply Comments, Dr. Santini urges that Illinois should focus on promoting low cost, low power residential and workplace charging to support plug-in hybrid vehicles and eventually future range-extended EVs that will not need to rely on intercity fast-charging equipment.⁷⁹² Dr. Santini also recommended that Illinois work with other midcontinent states to develop an incentive program that supports flexible use of high-octane premium gasoline or biofuels within future long-range plug-in hybrids and range extended EVs.⁷⁹³

⁷⁸⁷ Id.

⁷⁸⁸ Id.

⁷⁸⁹ Id.

⁷⁹⁰ IER Reply Comments at 3.

⁷⁹¹ IIEC Reply Comments at 4.

⁷⁹² Santini Reply Comments at 12.

⁷⁹³ Id.

III. Analysis and Conclusion

Analysis:

In response to this Notice of Inquiry, the Commission received 23 Initial Comments and eleven Reply Comments from a total of 26 different entities. The Commission carefully considered each submission and analyzed the information provided.

A. Energy Efficiency

Regarding energy efficiency, participants such as ABB, Ameren, ATE, ComEd, UCS, Sierra Club and NRDC, and Tesla agreed that electric vehicles are inherently more energy efficient compared to internal combustion engine vehicles.⁷⁹⁴ ComEd and UCS both cited the U.S. Department of Energy, which states that electric engines convert between 54% and 62% of the electric energy they receive, while ICE vehicles convert only between 17% and 21% of energy stored in gasoline to power.⁷⁹⁵ Additionally, participants such as ABB, Ameren, ComEd, and Tesla indicated that energy efficiency will improve further with a well-thought-out charging infrastructure design. Dr. Santini noted that energy efficiency will depend on the time of day the EV is charged, what kind of charger is utilized, and the distance the EV travels.⁷⁹⁶

IIEC challenged ABB, Ameren, ATE, ComEd, UCS, Sierra Club and NRDC, and Tesla in claiming that EVs are inherently energy efficient.⁷⁹⁷ IIEC believes that this issue should be determined through a proceeding or working group other than this Notice of Inquiry.

⁷⁹⁴ See ABB Initial Comments at 2; Ameren Initial Comments at 3; ATE Initial Comments at 2; ComEd Initial Comments at 2; UCS Initial Comments at 5; Sierra Club and NRDC Initial Comments at 2; Tesla Initial Comments at 2.

⁷⁹⁵ See ComEd Initial Comments at 2; UCS Initial Comments at 5.

⁷⁹⁶ Santini Reply Comments at 11.

⁷⁹⁷ IIEC Reply Comments at 2.

B. Grid Reliability and Resilience

Upon reviewing comments regarding grid reliability and resilience, participants, such as ABB, ChargePoint, Sierra Club and NRDC, Tesla, and UCS, agreed that EV load can significantly affect the grid.⁷⁹⁸ The consensus among these entities was that load must be managed and planned out efficiently to incentivize off-peak charging. Some suggestions included time-of-use rates that encourage off-peak charging or other demand response programs established by utilities.

Ameren, ABB and ATE also agreed that off-peak charging should be encouraged to benefit the grid. However, ATE indicated that EV load does not benefit the grid at all and should be considered a demand-side resource.⁷⁹⁹ Ameren indicated that benefits to the grid due to EV load are limited without vehicle-to-grid capabilities (which is currently not offered on the market) and associated grid infrastructure to support it.⁸⁰⁰ Other entities, like UCS, disagreed and stated that V2G capabilities are not necessary in order for EVs to benefit the grid given that EV charging load is flexible and can be managed through various price signals to smooth power generation ramping, reduce peak loads, and incorporate renewables into the grid. The MMC stated that EV charging could produce savings for ratepayers if the revenue from additional consumption during off peak times offsets infrastructure upgrades required to accommodate EV charging.⁸⁰¹

IIEC indicated that it is too early to determine the long-term effect that EV load will have on the grid given any conclusion reached at this point in time would be based on assumptions that may or may not reflect utility-specific factors.⁸⁰²

⁷⁹⁸ See ABB Initial Comments at 3; ChargePoint Initial Comments at 1; Sierra Club and NRDC Initial Comments at 6; Tesla Initial Comments at 4; UCS Initial Comments at 2.

⁷⁹⁹ ATE Initial Comments at 3.

⁸⁰⁰ Ameren Initial Comments at 4-5.

⁸⁰¹ MMC Initial Comments at 3-4.

⁸⁰² IIEC Reply Comments at 3.

C. Barriers

The most frequently cited barriers to EV adoption include (1) high upfront costs,⁸⁰³ (2) range anxiety and lack of charging infrastructure,⁸⁰⁴ and (3) lack of consumer awareness and education and outreach.⁸⁰⁵

a. High Upfront Costs

Ameren, ATE, ChargePoint, ComEd, CUB/EDF, Siemens, Tesla, and UCS all identified the higher upfront purchase price of EVs when compared to traditional ICE vehicles as being a primary economic barrier to increased electrification of the transportation sector.⁸⁰⁶ Ameren, ATE, ComEd, CUB/EDF, Tesla, and UCS also noted that the cost to purchase and install charging infrastructure is an additional barrier.⁸⁰⁷

A number of commenters offered solutions to the high upfront cost barrier. For example, ABB stated that enhanced rebates on EVs at state and regional levels could be provided and ABB indicated support for charging infrastructure rebates where deployments are well planned with an operational model, including uptime and performance metrics and similar accountability measures.⁸⁰⁸ Similarly, ComEd stated that incentives, such as rebates, subsidies, and tax incentives, on the purchase or lease of the EV and the purchase and installation of charging equipment, are possible solutions

⁸⁰³ See Ameren Initial Comments at 9; ATE Initial Comments at 6; ChargePoint Initial Comments at 7; ComEd Initial Comments at 6; CUB/EDF Initial Comments at 3; Siemens Initial Comments at 3; Tesla Initial Comments at 7; UCS Initial Comments at 5.

⁸⁰⁴ See Ameren Initial Comments at 9, 14; ATE Initial Comments at 6; ComEd Initial Comments at 6; CUB/EDF Initial Comments at 3; Sierra Club and NRDC Initial Comments at 10; UCS Initial Comments at 5; Greenlots Reply Comments at 3; Tesla Reply Comments at 1.

⁸⁰⁵ See Ameren Initial Comments at 8-9; ATE Initial Comments at 5-6; ComEd Initial Comments at 6; Sierra Club and NRDC Initial Comments at 10-11; Tesla Initial Comments at 8.

⁸⁰⁶ See Ameren Initial Comments at 9; ATE Initial Comments at 6; ChargePoint Initial Comments at 7; ComEd Initial Comments at 6; CUB/EDF Initial Comments at 3; Siemens Initial Comments at 3; Tesla Initial Comments at 7; UCS Initial Comments at 5.

⁸⁰⁷ See Ameren Initial Comments at 9; ATE Initial Comments at 6; ComEd Initial Comments at 6; CUB/EDF Initial Comments at 3; Tesla Initial Comments at 7; UCS Initial Comments at 5.

⁸⁰⁸ ABB Initial Comments at 6.

to overcome economic barriers.⁸⁰⁹ Ameren maintained that because lower income customers may not have tax liability, a tax credit may not be as beneficial to them; therefore, Ameren suggested that Illinois could adopt a different or additional subsidy that these customers may be eligible to receive.

Also, Ameren suggested that Illinois could consider providing a vehicle financing option for the purchase of EVs that is made available to customers that are retiring older ICE vehicles or based on income.⁸¹⁰ UCS recommended on-bill financing by utilities for EVs and EV charging infrastructure.⁸¹¹ UCS stated that the utilities could provide on-bill financing to complement other funding sources and provide a long-term, sustainable way to address EV costs in order to reach a larger audience of vehicle owners and expand benefits to ratepayers.⁸¹²

ATE stated that solutions include continued cost reduction efforts by automobile original equipment manufacturers to bring the upfront purchase price of EVs down, and efforts by battery developers to lower costs. Also ATE noted that utility programs may be very effective in addressing economic barriers by cost-sharing initial infrastructure.⁸¹³ Finally, Siemens claimed that larger market penetration can only be achieved if EVs become price competitive with ICE vehicles.⁸¹⁴

b. Range Anxiety and Lack of Charging Infrastructure

Ameren, ATE, ComEd, CUB/EDF, Greenlots, Sierra Club and NRDC, Tesla, and UCS all identified the lack of charging infrastructure or range anxiety as a primary barrier to increased electrification of the transportation sector.⁸¹⁵ Greenlots stated that the

⁸⁰⁹ ComEd Initial Comments at 6.

⁸¹⁰ Ameren Initial Comments at 10.

⁸¹¹ UCS Initial Comments at 5-6.

⁸¹² UCS Initial Comments at 6.

⁸¹³ ATE Initial Comments at 7.

⁸¹⁴ Siemens Initial Comments at 3.

⁸¹⁵ See Ameren Initial Comments at 9, 14; ATE Initial Comments at 6; ComEd Initial Comments at 6; CUB/EDF Initial Comments at 3; Sierra Club and NRDC Initial Comments at 10; UCS Initial Comments at 5; Greenlots Reply Comments at 3; Tesla Reply Comments at 1.

existing lack of infrastructure has been a primary barrier for auto manufacturers to assess demand for electric vehicles and has slowed down investment, planning, and development in electric models.⁸¹⁶ Greenlots indicated that an adequate volume of charging infrastructure means that auto manufacturers can focus on non-infrastructure barriers such as model availability, dealership training, and marketing. Ameren believes that deployment of EV charging infrastructure will need to lead EV adoption to eliminate this significant barrier.⁸¹⁷ Similarly, Tesla stated that the primary way to promote EV adoption and utilization is through improving access and development of EV charging infrastructure.⁸¹⁸

While ABB stated that cities and communities should streamline the permitting process to make infrastructure deployments more efficient,⁸¹⁹ the most commonly cited solution to overcome this barrier was utility involvement in the charging infrastructure deployment. For example, Sierra Club and NRDC emphasized that utilities are in the best position to support early deployment of EV charging infrastructure, especially at sites where private build-out is not feasible, like at multi-unit dwellings.⁸²⁰ ComEd stated that possible solutions to overcome these barriers include (1) assurance of cost recovery for utilities for EV infrastructure and charging stations; and (2) clear policy direction regarding EVs and EV charging infrastructure.⁸²¹ ComEd believes that utility ownership of public use charging stations is an important element for the advancement of electrification of the transportation sector. In particular, while not limited to any specific market or purpose, ComEd argued that utility ownership could assist with placement of charging stations in underserved market segments such as renters, low income neighborhoods, multi-unit dwellings, and curbside charging.⁸²² Greenlots indicated that the current market state of

⁸¹⁶ Greenlots Reply Comments at 5.

⁸¹⁷ Ameren Initial Comments at 15.

⁸¹⁸ Tesla Initial Comments at 10.

⁸¹⁹ ABB Initial Comments at 5.

⁸²⁰ Sierra Club and NRDC Reply Comments at 5.

⁸²¹ ComEd Initial Comments at 6.

⁸²² Id. at 10

EVs warrants public investment and the involvement of regulated monopolies. Greenlots stated further that ownership and operation of charging infrastructure – including charging stations – is an appropriate and necessary role for the utility in order to accelerate the market across most market segments, to increase competition and to attract private investment.⁸²³ Moreover, Greenlots argued that the nature of charging station assets fits very well within the core competencies and capabilities of utilities.⁸²⁴ ATE stated that utilities should be allowed to own and operate a portfolio of charging stations and that utilities should provide a robust role in the planning and operation of these network management systems.

ATE argued that any rules constraining the utility role should be addressed and resolved so utilities can fully participate in EV infrastructure deployment.⁸²⁵ In a similar vein, Tesla argued the Commission should remove barriers to charging station deployment by providing utilities with guidelines about their role in increasing access to charging infrastructure, cost recovery (e.g., designing charging station rate programs), examining line extension policies, and how and when utilities may invest in charging stations.⁸²⁶ Siemens argued that utilities should be permitted to own chargers in order for EV owners and ratepayers to receive greater benefits at lower costs from EV adoption as well as to drive grid benefits.⁸²⁷

In contrast, some parties raised concerns regarding competition from utilities that may stifle private investment. CUB/EDF argued that utilities may have the information and resources to plan and deploy EV charging infrastructure in an organized, intentional manner, but allowing utilities to crowd out private competitors could have a chilling effect on private investment and innovation.⁸²⁸ CUB/EDF also expressed concern that there is

⁸²³ Greenlots Reply Comments at 4.

⁸²⁴ Id.

⁸²⁵ ATE Initial Comments at 13.

⁸²⁶ Tesla Initial Comments at 13.

⁸²⁷ Siemens Initial Comments at 2.

⁸²⁸ CUB/EDF Initial Comments at 4.

a risk of utilities investing in underused, and thus costly, charging stations or imposing infrastructure costs on ratepayers who do not benefit from them. CUB/EDF cautioned against creating a profit incentive for utilities to overbuild. CUB/EDF acknowledged that utility investment might be an appropriate approach to building necessary charging infrastructure in areas demonstrated to be inadequately served by private investment, such as low-income and/or rural communities.⁸²⁹ AFPI argued that utilities owning and/or operating charging infrastructure would result in cross-subsidization. AFPI argued further this concern is intensified by the structure of incentives that would come as a result, where the risk-free decisions of guaranteed rate of return of monopolies will inevitably result in suboptimal investment decisions, compared to those of private sector actors and is unjustifiable at the expense of the equal rights of the people of Illinois.⁸³⁰

c. Lack of Consumer Awareness and Education and Outreach

Ameren, ATE, ComEd, Sierra Club and NRDC, and Tesla all identified the lack of consumer awareness, education, and outreach as a primary barrier to increased electrification of the transportation sector.⁸³¹ ATE stated that consumers' general lack of awareness of the EV market and how many and what type of light duty EVs are available to drive is one of the largest barriers to greater EV adoption.⁸³² ATE contended that education and outreach includes educating automobile dealers not trained to sell or advise on EVs.

The most commonly cited solution to the lack of consumer awareness and education and outreach barrier was for the utilities to engage in EV educational efforts. For example, Tesla indicated that utilities can educate customers about EVs, where and

⁸²⁹ Id.

⁸³⁰ AFPI Reply Comments at 2.

⁸³¹ See Ameren Initial Comments at 8-9; ATE Initial Comments at 5-6; ComEd Initial Comments at 6; Sierra Club and NRDC Initial Comments at 10-11; Tesla Initial Comments at 8.

⁸³² ATE Initial Comments at 5.

how to charge, and about costs for using electricity relative to oil-consuming cars.⁸³³ ATE stated that utilities with best practices to address such issues have web portals to provide general and specific EV information to customers.⁸³⁴ Ameren argued that utilities engaged in promotional advertising of the benefits of EVs should be permitted recovery of reasonable advertising expense because with respect to EV adoption, there are clear societal and public policy benefits of EVs.⁸³⁵ Ameren suggested that the Commission could clarify that utility efforts to inform consumers of EV options, or undertake practices that promote their adoption, are not actions that would constitute “promotional practices,” and that promotion of EVs is a permissible activity and recovery of related reasonable advertising expense will be allowed.⁸³⁶ Ameren stated that Commission clarification could be accomplished through a determination that Parts 275 and 295 of the 83 Ill. Adm. Code do not apply to utility-sponsored efforts to increase public awareness and adoption of EVs. Or, Ameren stated, the Commission could grant declaratory rulings, issue waivers, modify rules, or approve specific tariff language to resolve any legal ambiguity with respect to specific undertakings.⁸³⁷

In contrast, with respect to utilities providing education to consumers to promote EV ownership, AFPI strongly disagreed that utilities are appropriate actors to educate the public and automakers on consumer options and cost saving benefits of EVs to support EV expansion.⁸³⁸ AFPI found that there was no valid reason to allow cost recovery for advertising expenses for the benefit of private entities if utilities were to decide to engage in such activities. AFPI argued that such practices are and should continue to be deemed under Illinois code, “promotional practices.” AFPI stated that if carmakers and charging station providers find there is a lack of public awareness with regard to their products and

⁸³³ Tesla Initial Comments at 8.

⁸³⁴ ATE Initial Comments at 6.

⁸³⁵ Ameren Initial Comments at 8.

⁸³⁶ Ameren Initial Comments at 8.

⁸³⁷ *Id.* at 8-9.

⁸³⁸ AFPI Reply Comments at 3.

services, it should not be incumbent on the ratepayers of Illinois to underwrite such expenses. AFPI strongly urged the Commission to unambiguously clarify this point in the interest of protecting ratepayers.⁸³⁹

D. Benefits

Several participants commented on the myriad of benefits surrounding electric vehicle deployment. Among the many benefits listed, the main benefits included environmental benefits and economic benefits.

a. Environmental Benefits

Entities like AEE, Ameren, ATE, Tesla, CACC, Chanje, ComEd, CUB/EDF, Elevate Energy, MMC, Sierra Club and NRDC, Greenlots, UCS, and Workhorse agreed that EVs will reduce GHG emissions.⁸⁴⁰ In a national effort to reduce carbon emissions, a majority of participants stated that transitioning from internal combustion engine vehicles to electric vehicles will reduce carbon emissions significantly. This is especially the case if public transportation and last-mile delivery companies electrify.

ATE, Ameren, ABB, MMC, Sierra Club and NRDC, Workhorse, and Greenlots emphasized that EVs will improve air quality and the environment in disadvantaged neighborhoods, densely populated areas, and along highly utilized delivery routes.⁸⁴¹ Those participants argued that electrification is most beneficial in those areas.

⁸³⁹ Id.

⁸⁴⁰ See AEE Initial Comments at 1; ATE Initial Comments at 2; Tesla Initial Comments at 9; CACC Initial Comments at 2; Chanje Reply Comments at 1-2; Ameren Initial Comments at 13; ComEd Initial Comments at 7-8; CUB/EDF Initial Comments at 3-4; Elevate Energy Initial Comments at 3; MMC Initial Comments at 2; Sierra Club and NRDC Initial Comments at 13; Greenlots Reply Comments at 2; UCS Initial Comments at 7-8; Workhorse Initial Comments at 1.

⁸⁴¹ See ATE Initial Comments at 9; Ameren Initial Comments at 10; ABB Initial Comments at 7; MMC Initial Comments at 2; Sierra Club and NRDC Initial Comments at 14; Workhorse Initial Comments at 1; Greenlots Initial Comments at 1.

AFPI and the IER warned that, contrary to what many participants suggested, EVs might not yield net emission reductions in Illinois.⁸⁴² IER stated that the “social value” of EVs is potentially overstated and might not accurately represent EVs’ actual benefits.⁸⁴³

b. Economic Benefits

One economic aspect that was extensively discussed was the effect on ratepayers from the additional EV load on the electric utilities’ distribution grids. ABB, AEE, ATE, Chanje, ComEd, Siemens, Sierra Club and NRDC, and Tesla agreed that if properly managed, EV load can reduce the electric rates of many utility customers, especially those who own EVs and charge during off-peak times.⁸⁴⁴ However, some entities were concerned that low-income customers would be burdened by the additional load on the electric grid that might lead to increased rates.⁸⁴⁵

Participants like Ameren, ATE, and Siemens also stated that the cost of owning and operating EVs is less than the cost of owning and operating ICE vehicles.⁸⁴⁶ While API-IPC stated that the cost of EVs is higher, UCS rebutted stating that the study API-IPC relied upon was flawed by assuming that EV battery packs last only as long as the warranty, and that EV drivers will require an alternative gasoline car for a quarter of the miles they drive.⁸⁴⁷

E. EV Charging Infrastructure

Most participants agreed that a lack of charging infrastructure is a barrier to increased EV deployment. Participants, like ABB, Ameren, CACC, ChargePoint, ComEd,

⁸⁴² See AFPI Initial Comments at 2; IER Reply Comments at 4-6.

⁸⁴³ IER Reply Comments at 6.

⁸⁴⁴ See ATE Initial Comments at 9; Siemens Initial Comments at 4; ComEd Initial Comments at 7; Tesla Initial Comments at 10; ABB Initial Comments at 6; AEE Initial Comments at 14-15; Sierra Club and NRDC Initial Comments at 12; Chanje Reply Comments at 3.

⁸⁴⁵ See IIEC Reply Comments at 4.

⁸⁴⁶ See ATE Initial Comments at 9; Siemens Initial Comments at 4; Ameren Initial Comments at 12.

⁸⁴⁷ UCS Reply Comments at 6.

Greenlots, Tesla, and UCS agreed that in order to cure customers' anxiety regarding the lack of charging infrastructure, more chargers need to be developed.⁸⁴⁸ However, some issues that participants disagreed on regarding EV charging infrastructure involved siting, fast chargers vs. slow chargers, and ownership of charging infrastructure.

a. Siting

The AG cited a study which indicates that 80 percent of charging is done at home.⁸⁴⁹ Thus, the AG stated that development of charging infrastructure should be focused on residential charging stations, as opposed to other locations. However, other participants, like Sierra Club and NRDC, indicate that charging infrastructure is important to develop at residential locations, as well as at work.⁸⁵⁰ Some participants agreed with Tesla, which promotes a philosophy of "charge where you park".⁸⁵¹ This means that charging infrastructure should be developed at home, at work, at malls and restaurants, along highway corridors, or any other location where cars would dwell for longer periods of time.

Participants like ABB, Ameren, ChargePoint, ComEd, and Tesla highlighted the importance of penetrating low-income communities that generally have less access to EVs and EV charging infrastructure.⁸⁵² Low-income communities generally consist of multi-unit dwellings where residential charging infrastructure is not an available option. Participants suggested that those communities can be penetrated by developing public or community charging stations or electrifying public transportation.

⁸⁴⁸ See Ameren Initial Comments at 15; CACC Initial Comments at 5; ChargePoint Initial Comments at 8; ComEd Initial Comments at 8; Tesla Initial Comments at 10-11; UCS Initial Comments at 6; Greenlots Reply Comments at 4; ABB Reply Comments at 7.

⁸⁴⁹ AG Initial Comments at 2.

⁸⁵⁰ Sierra Club and NRDC Initial Comments at 14-15.

⁸⁵¹ Tesla Initial Comments at 4.

⁸⁵² See ABB Initial Comments at 8; Ameren Initial Comments at 17; ChargePoint Initial Comments at 14; ComEd Initial Comments at 9; Tesla Initial Comments at 13.

b. Fast Chargers vs. Slow Chargers

Many participants, like ABB, Ameren, ComEd, EVgo, and Tesla, agreed that in order to serve the most diverse needs of EV customers, EV chargers must consist of both fast chargers, as well as slow chargers.⁸⁵³ In order to determine which type of charger fits the needs of customers most, it is important to understand the demographic of customers in a certain area, and what their needs are.

Other participants, like ATE, CACC, and Sierra Club and NRDC, indicated that access to DCFC is critical in order to reduce “range anxiety” and meet customers’ expectations.⁸⁵⁴

Dr. Santini recommended that the focus should be on slow charging infrastructure, which is most compatible with plug-in vehicles.⁸⁵⁵

c. Ownership

Lastly, participants thoroughly discussed the issue of ownership and whether charging infrastructure should be owned by the utilities or a third-party.

Several participants, including EVgo, Greenlots, Siemens, and Sierra Club and NRDC indicated that utilities should own charging infrastructure.⁸⁵⁶ The main reason these entities encouraged utility ownership is because utilities possess most of the data and are in the best position to determine where additional infrastructure can be developed and at what rate electricity can be provided and charged. Additionally, some participants indicated that utilities are in the best position to invest in charging infrastructure at this stage.

⁸⁵³ See ABB Initial Comments at 8; Ameren Initial Comments at 18; ComEd Initial Comments at 10; EVgo Initial Comments at 2; Tesla Initial Comments at 13.

⁸⁵⁴ See CACC Initial Comments at 5; Sierra Club and NRDC Initial Comments at 14; ATE Initial Comments at 14.

⁸⁵⁵ Santini Initial Comments at 1.

⁸⁵⁶ See Siemens Initial Comments at 4; Greenlots Reply Comments at 4; Sierra Club and NRDC Reply Comments at 5; EVgo Initial Comments at 1.

Other participants disagreed that utilities should own charging infrastructure. Both AFPI and API-IPC opposed utilities owning charging infrastructure.⁸⁵⁷ AFPI stated that it will result in an unfair shifting of costs onto those who have not opted for EVs.⁸⁵⁸ Instead, they encouraged a market approach, where third-parties own charging infrastructure.

CUB/EDF and Sierra Club and NRDC added that the issue of ownership should not overshadow the issue of managing EV load efficiently.⁸⁵⁹ They added that third-parties will generally take calculated investment risks in charging infrastructure.

F. Ratemaking

Participants discussed electric rate designs and addressed whether it would be wise to adjust existing electric rate designs with regards to electricity consumption from EVs. ABB, Ameren, ChargePoint, ComEd, CUB/EDF, Elevate Energy, and UCS supported using time varying rates, such as time-of-use rates, to encourage off-peak charging, especially for residential customers.⁸⁶⁰ Ameren claimed that time-of-use charging would promote more efficient utilization of the power grid and benefit all customers, not just EV drivers.⁸⁶¹

IIEC stated that the ICC should generally set rates that best represent the cost of providing regulated utility services.⁸⁶² It further stated that if rates were properly set, it would be unnecessary and inappropriate to change the rate structure to incentivize one aspect of electric utility service, such as EVs.⁸⁶³

⁸⁵⁷ AFPI Initial Comments at 1; API-IPC Revised Initial Comments at 2.

⁸⁵⁸ API-IPC Revised Initial Comments at 2.

⁸⁵⁹ See CUB/EDF Initial Comments at 4; Sierra Club and NRDC Reply Comments at 5.

⁸⁶⁰ See ABB Initial Comments at 9; Ameren Initial Comments at 19; ChargePoint Initial Comments at 20; CUB/EDF Initial Comments at 4; Elevate Energy Initial Comments at 1; UCS Initial Comments at 6; ComEd Initial Comments at 12.

⁸⁶¹ Ameren Initial Comments at 19.

⁸⁶² IIEC Initial Comments at 1.

⁸⁶³ Id.

Sierra Club and NRDC warned that demand charges might undermine the business case for high-power EV charging infrastructure investments.⁸⁶⁴ Sierra Club and NRDC recommended that transportation electrification loads should not be subsidized; rather, rate designs should be optimized for intended uses.⁸⁶⁵ They also recommended that the ICC review current utility rates for compatibility with transportation electrification use cases and that the ICC direct or lead a process to develop new rates where they are not optimized to support transportation electrification.⁸⁶⁶

EVgo pointed out that current commercial rate structures were not designed with EVs' unique load profiles in mind.⁸⁶⁷ EVgo noted that innovative rate structures would encourage EV adoption.⁸⁶⁸

The NOI asked participants to list examples of other rate structures adopted by other utilities. Many participants provided examples of rate designs from other jurisdictions that focused on incentivizing off-peak charging.

IIEC noted that utilities such as Consumer Energy Company, DTE Energy Company, Pacific Gas & Electric Company, and Southern California Edison offer EV designated tariffs for service to customers who charge EVs at home.⁸⁶⁹

Sierra Club and NRDC pointed out that Pacific Power (Oregon) received approval from the Oregon Public Utilities Commission for a special tariff rate to replace a portion of demand charges for a nine-year period.⁸⁷⁰ Its sister utility, NV Energy (Nevada) recently filed for approval of a similar rate design before the Nevada Public Utilities Commission.⁸⁷¹

⁸⁶⁴ Sierra Club and NRDC Initial Comments at 18.

⁸⁶⁵ Id.

⁸⁶⁶ Id. at 17.

⁸⁶⁷ EVgo Initial Comments at 2.

⁸⁶⁸ Id.

⁸⁶⁹ IIEC Initial Comments at 4.

⁸⁷⁰ Sierra Club and NRDC Initial Comments at 19.

⁸⁷¹ Id.

G. Regulatory Treatment of EVs and Charging Stations

a. Should EVs be treated as distributed energy resources (“DERs”) for regulatory purposes?

ATE and Sierra Club and NRDC agreed that EVs should be treated as distributed energy resources. ATE recommended that utility investments in these grid-edge assets should be treated similarly to other assets because many EVSE include demand response capabilities and distributed storage can be added in the future if useful and cost effective.⁸⁷² Sierra Club and NRDC noted the flexibility of EV charging provides EVs with DER capabilities through vehicle-grid integration and “managed charging.” Managed charging is EV charging that is managed or adjusted based on grid conditions via communications with the grid operator.⁸⁷³ Sierra Club and NRDC recommended the Commission explore how EVs can be leveraged to achieve renewable portfolio standards by leveraging the inherent, flexible storage capacity in batteries already purchased to improve load shape (lowering EV ownership cost), integrating variable renewable energy resources, and facilitating cost-effective grid management.⁸⁷⁴

Conversely, ChargePoint, ComEd and IIEC argued that EVs and charging infrastructure do not fall under the existing definition of DERs. ChargePoint noted the primary purpose of EVs and EVSE is to support the conveyance of drivers, riders, and goods between destinations requiring separate considerations from DERs.⁸⁷⁵ Furthermore, ChargePoint recommended the Commission explore the creation of a unique statewide framework for EVs and EV charging rather than apply existing DER transportation electrification technologies.⁸⁷⁶ Similarly, ComEd believed the nascent technology and capabilities of EVs (batteries) are not generators and are not considered a DER.⁸⁷⁷ IIEC echoed the argument that EVs or charging stations should not be

⁸⁷² ATE Initial Comments at 18.

⁸⁷³ Sierra Club and NRDC Initial Comments at 20.

⁸⁷⁴ *Id.* at 20-21.

⁸⁷⁵ ChargePoint Initial Comment at 20-21.

⁸⁷⁶ *Id.* at 21.

⁸⁷⁷ ComEd Initial Comments at 12.

classified as a DER on the basis of battery back-up or battery storage because the necessary VGI technologies are not fully developed or widely available.

Tesla recommended that a determination regarding the treatment of EVs as DERs not be made at this time. Given the relatively low uptake of EVs and limited customer experience of using EVs as DER, Tesla argued for the Commission to monitor customer adoption of EVs, DER deployment, and customer participation and preferences using their EVs and EVSE as DER or grid resources.⁸⁷⁸

- b. Should passenger cars, transportation vehicles, and corporate fleets be treated equally? Should one type be favored over others?

ChargePoint recommended different EV load profiles with different value propositions to the grid should not be favored over one another, but some are more suitable for serving as reliable DERs.⁸⁷⁹ Tesla recommended a holistic evaluation of electrification transportation with an emphasis on driving adoption of light duty EVs to long-term needs of heavy duty trucks infrastructure needs.⁸⁸⁰

- c. How can unique demand response programs be structured for each customer classification?

ComEd noted the technology and market is emerging and it is too soon to define demand response programs for customer classifications.⁸⁸¹ Tesla endorsed using EVs and charging stations as tools in demand response programs that should be treated like other demand response mechanisms.⁸⁸²

⁸⁷⁸ Tesla Initial Comments at 17.

⁸⁷⁹ ChargePoint Initial Comments at 21.

⁸⁸⁰ Tesla Initial Comments at 18.

⁸⁸¹ ComEd Initial Comments at 13.

⁸⁸² Tesla initial Comments at 18.

d. How should common charging stations be categorized for regulatory and accounting purposes?

Some parties agreed utilities should develop and own publicly available EV charging stations for various reasons, from cheaper access to capital and grid knowledge to better site public charging stations locations. ComEd recommended treating utility owned charging stations as a long-lived capital asset included in the utility's rate base.⁸⁸³

The IIEC argued for allowing the development of charging stations to flourish as a competitive industry. IIEC and the AG noted that it remains to be determined whether existing statutory authority treats the construction of either in-home or public charging stations as a utility function.⁸⁸⁴ Moreover, the regulatory treatment of utility charging stations should properly consider the competitive advantage utilities would gain over presently operating competitive providers if utilities are granted authority to develop charging stations.⁸⁸⁵

e. Should common charging stations and privately-owned charging stations enjoy the same regulatory and accounting treatment?

ComEd argued that privately-owned charging stations are subject to standard accounting practices and are outside the scope of regulatory treatment.⁸⁸⁶ Similarly, Sierra Club and NRDC cited the Illinois Public Utilities Act that clearly states private or public entities that develop and operate EV charging stations through their own means do not meet the definition of a public utility. The absence of regulatory treatment enables pricing of EV charging services by the kWh, an easily understood unit of measurement. However, where a public utility deploys or facilitates deployment of publicly-accessible or private EV charging stations, such activities are subject to Commission oversight. Also,

⁸⁸³ ComEd Initial Comments at 13.

⁸⁸⁴ IIEC Reply Comments at 5.

⁸⁸⁵ Id.

⁸⁸⁶ ComEd Initial Comments at 14.

Sierra Club and NRDC noted the Commission may wish to use its oversight authority to ensure price and load management signals encourage off-peak charging, and clarify terms of station maintenance to ensure charging stations are used and useful.⁸⁸⁷

- f. Discuss what kinds of incentives could be implemented to encourage further EV penetration into the US markets.

Ameren and ComEd suggested various incentives can play a significant role in accelerating EV deployment. Ameren recommended partnerships with regulators and stakeholders to develop cost-effective market incentives for deployment of charging infrastructure and across the EV value chain. Ameren recommended cost recovery for the following: community-based EV marketing efforts, utility consumer EV education to increase adoption rates, programs that extend EV technology benefits to lower-income customers, and dedicated EV staffing resources.⁸⁸⁸ ComEd recommended incentives such as local and state tax incentives for EV charging stations; rebates for EVs and charging stations provided by the state and/or utility; access to HOV lanes; reduced vehicle registration fees; reduced permitting costs for EV infrastructure; and reduced/eliminated highway tolls.⁸⁸⁹

Ameren noted that marketplace incentives should attract customers and manufacturers.⁸⁹⁰ Similarly, the CACC recommended the ICC form a multi-state leadership coalition to prioritize “strong” policies and programs in the NASEO’s report. According to the CACC, doing so signals to vehicle equipment manufacturers, utilities, and the EVSE industry that the Midwest is a prime market.⁸⁹¹

MMC suggested municipalities can encourage EV adoption through municipal fleets, and through incentives such as local codes and policies that support access to EV

⁸⁸⁷ Sierra Club and NRDC Initial Comments at 21.

⁸⁸⁸ Ameren Initial Comments at 23.

⁸⁸⁹ ComEd Initial Comments at 14.

⁸⁹⁰ Ameren Initial Comments at 23.

⁸⁹¹ CACC Initial Comments at 2.

charging infrastructure. MMC noted that under FEJA, utilities pool and use funds collected from EV charging to incentivize energy efficiency and renewable energy measures.⁸⁹² The MMC recommended considering the allocation of such funds to support the adoption of EVs and their infrastructure.⁸⁹³

Dr. Santini recommended policies that support low cost, low power residential and workplace charging to support plug-in hybrid vehicles and future range-extended EVs that will not rely on expensive intercity fast charging equipment. Dr. Santini also recommended Illinois work with other midcontinent states to develop incentives supporting use of high octane premium gasoline or biofuels within future long-range plug-in hybrids and range extended EVs.⁸⁹⁴

AFPI, API-IPC, the AG, and the IMA recommended that policies should not include subsidies to accelerate EV adoption and the development of charging infrastructure at this time. The AG discouraged incentives due to the speculative nature of the emerging and future EV market. Instead, the AG recommended to recognize where Illinois is today and to only address currently arising EV issues.⁸⁹⁵ Similarly, AFPI discouraged the Commission from creating incentives that pick winners and losers.⁸⁹⁶ For example, AFPI cited a report from the Congressional Budget Office that estimated that the Qualified Plug-in Electric Vehicle Tax credit cost the federal government anywhere from \$230 to \$4,400 for every ton of carbon dioxide emissions that the subsidy reduces. AFPI argued that these cost estimates, together with other federal, state and local subsidies, far exceed the estimated value of avoiding carbon dioxide emissions by every governmental entity.⁸⁹⁷ API-IPC recommended policies that provide for customer choice and allow the free market to determine the energy sources required to meet societal needs and these

⁸⁹² MCC Initial Comments at 1, 3.

⁸⁹³ Id.

⁸⁹⁴ Santini Reply Comments at 12.

⁸⁹⁵ AG Initial Comments at 2.

⁸⁹⁶ AFPI Initial Comments at 2.

⁸⁹⁷ Id.

policies should not include subsidies through tax credits, rebates, utility rate increases, or other financial incentives.⁸⁹⁸ IMA echoed the argument that it is important that manufacturers produce a variety of vehicles, including EVs, so customers have a choice; however, policies should support competition and refrain from implementing government mandates that would provide an unfair advantage to any particular vehicle.⁸⁹⁹

Additionally, ChargePoint and the IER agreed with other stakeholders that the market needs to stay innovative and competitive.⁹⁰⁰ ChargePoint argued a competitive market will improve access to charging and charging networks and improve customer experience. IER recommended that Illinois' competitive electricity market should have stable rules and approximate a standard market as much as possible.⁹⁰¹ Ameren, ChargePoint, and Siemens agreed that customer choice is important and customers should have a choice of EV charging equipment and EV charging network services.⁹⁰²

IIEC recommended a cost-benefit analysis of EV incentives before ratepayers are burdened with EV cost recovery.⁹⁰³

Conclusion:

The Illinois Commerce Commission values the experience and knowledge the participants shared through their comments and appreciates each party's participation in this proceeding. The comments that were submitted in response to this Notice of Inquiry proceeding illuminate issues regarding the integration of EVs into the electric system. The comments also identify issues and questions requiring further examination. As such, the comments serve as a starting point for consideration by the Commission and discussions among stakeholders regarding the role of utilities, regulators, and other market

⁸⁹⁸ API-IPC Revised Initial Comments at 1.

⁸⁹⁹ IMA Initial Comments at 1.

⁹⁰⁰ ChargePoint Reply Comments at 4; IER Reply Comments at 3.

⁹⁰¹ IER Reply Comments at 3.

⁹⁰² Id.

⁹⁰³ IIEC Reply Comments at 4.

participants in the electric vehicle and charging infrastructure industry and the optimal level of regulatory guidance in the electric vehicle and charging infrastructure industry.

As identified in the Notice of Inquiry, the Commission did not intend for this proceeding to result in Commission action. Rather, the Notice of Inquiry proceeding and this report are intended to serve as reference tools that the Commission and other State policy makers may use when considering the appropriate regulatory framework for electric vehicles and electric vehicle charging infrastructure.